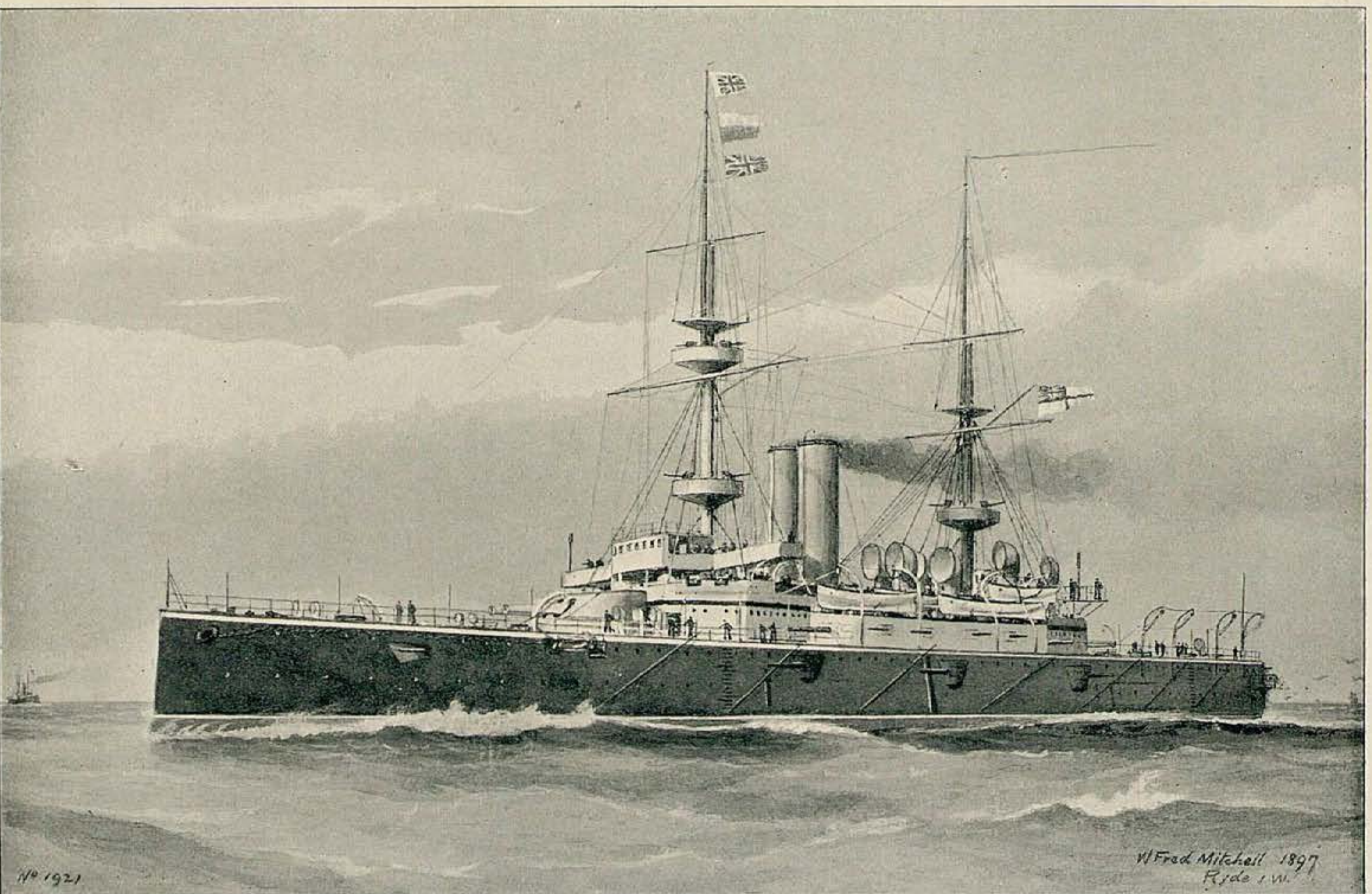

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THE NAVAL ANN

T. A. BRASSEY

1897



H.M.S. "RENOWN."

THE

NAVAL ANNUAL,

1897.

EDITED BY

T. A. BRASSEY.

PART [illegible] Sir George Clarke, K.C.M.G.; Korvetten [illegible] Ferber, I.G.N.; Captain C. Orde Browne; [illegible] R. [illegible], John Leyland, J. R. [illegible], E. Weyl, and [illegible]

PART [illegible] Commander C. N. Robinson, R.N.; J. Leyland; E. K. Barnes, M.I.N.A.

PART III.—Captain Orde Browne, [illegible] Lecturer on Armour to the R.A. College.

PART IV.—Official Statements and Naval Estimates.

"The maintenance of [illegible] Imperial defence against [illegible]

1897.

PORTSMOUTH:

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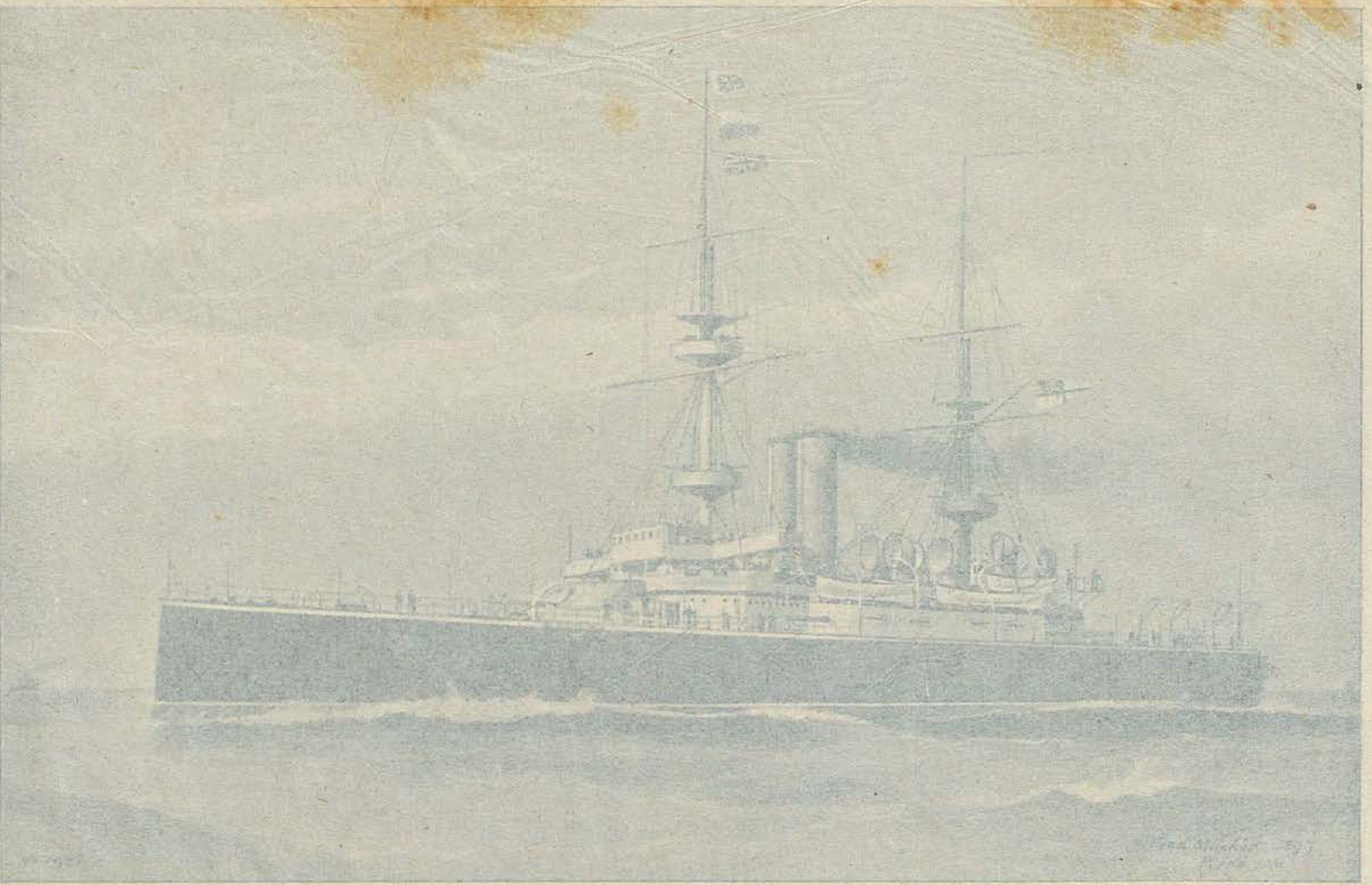
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PART II.—Commander C. N. ROBINSON, R.N.; J. LEYLAND; F. K. BARNES, M.I.N.A.

PART III.—Captain ORDE BROWNE, late R.A., Lecturer on Armour to the R.A. College.

PART IV.—OFFICIAL STATEMENTS and NAVAL ESTIMATES.

"The maintenance of sea supremacy has been assumed as the basis of the system of Imperial defence against attack from over the sea."—DUKE OF DEVONSHIRE.

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PREFACE.

THE difficulty of preparing the *Naval Annual* for publication in the absence of Lord Brassey in Australia has been very keenly felt during the past two years, but the favourable reception given to the last volume by its critics and the general public is an encouragement to persevere.

Complaints having reached us that in Part III. (Armour and Ordnance) injustice was done to British manufacturers in two respects, we take this opportunity of expressing our regret to Messrs. Armstrong, Mitchell and Co., that foreign quick-firing gun tables were published side by side with the Elswick quick-firing gun table, without prominent notes on all the tables to show that they were supplied by the makers, and, on the Elswick table, stating that only results actually obtained were given. This omission has been remedied. On the other hand, Captain Orde Browne's suggestion that we had temporarily fallen behind in the manufacture of armour appears to have been justified by the fact that armour tests have been made more stringent, and that British manufacturers have purchased from abroad during the past year the right to use certain processes. It is satisfactory to know that the results obtained with armour plates of recent British manufacture are as good or better than any obtained abroad.

The most important new feature in the present volume is the account of the organisation and administration of the German Navy, by Commander Ferber of the Naval Academy at Kiel. The proper rendering of many of the German terms has been a task of great difficulty. The translation has been carefully revised by two gentlemen who have an intimate acquaintance with the administration of the British Navy, as well as by the Editor. We are glad to have been able to secure the services of most of our old contributors. Mr. Thursfield has again been able to take charge of the chapter on Manœuvres, while Sir George Clarke, the author with Mr. Thursfield of the volume of essays published under the title of the "Navy and the Nation," contributes a chapter on "the limitations of passive defence." Indications are not wanting that there is a danger of these limitations being lost sight of.

The all-important problem of "the manning of the Navy in time of war" is treated but briefly in these pages, as the Editor dealt with the subject fully in a recent article, in which he had the advantage of his father's collaboration. Lord Brassey's latest plea for depending more largely on a Naval Reserve is reprinted at the end of the volume. It was intended to include an account of the British private establishments for the manufacture of ordnance and armour, but Commander Robinson unfortunately received his materials too late to enable him to prepare his chapter for the present number of the *Naval Annual*. It will appear in our next number. Special attention may be directed to the re-classification of battleships and first-class cruisers in the comparative tables, which are printed at the end of Chapter III.

No one is better aware than the Editor that, in spite of all the pains taken, the lists in Part II.—like other lists, official or non-official—will always contain errors. The coal supply column is the least satisfactory. Designers and builders of ships are very reluctant to disclose the amount of coal that can be carried on a given displacement. Important alterations have been made in the displacements of French ships, and in the Dutch and Turkish lists, from the best information obtainable.

We have to thank the Admiralty for furnishing us with diagrams of the Canopus and Arrogant classes, but foreign readers must understand that the Admiralty is in no way responsible for the publication of the *Naval Annual*. We have also to thank many British and foreign shipbuilders for kindly supplying us with information and enabling us to give illustrations of several new ships. We have drawn as usual on the *Times*, *Engineer*, and other papers for descriptions of ships and reports of trials.

We have increased the number of illustrations to eleven, as they apparently form an attractive feature in the book. We may point out that these sketches are in all cases from photographs or from the ship herself.

In conclusion, we would beg our readers, more especially Naval officers, for whose benefit the book is mainly carried on, to point out either to Commander Robinson or the Editor any errors they may observe, so that they may be corrected in subsequent volumes.

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PART I.

CHAPTER I.

The Progress of the British Navy.

The Navy Estimates for 1896–97 amounted to £21,823,000 as compared with £18,701,000 for 1895–96, or an increase of over three millions sterling, the principal items of increase being £1,970,000 for contract shipbuilding, £850,000 for armament, and £286,300 on the wages vote.* The increase of £294,000 for the wages of dockyard workmen was more than counterbalanced by a saving of £404,000 in cost of material. As will appear later, more ships have been completing in the dockyards during the past year than in the previous year, and during the completing stage the labour cost is far higher in proportion than in the earlier stages of construction when large quantities of material are worked into a ship. Apart from the estimates, a Naval Works Bill, extending that of the previous year, was passed into law, which entailed an expenditure of over £14,000,000 on the defences and improvement of harbours, on Naval barracks, etc. The most important items are three and a half millions (in round figures) for the construction of the mole and docks at Gibraltar, three millions for Keyham Dockyard, and two millions for the construction of a harbour at Dover. In January of the present year a Military Works Bill, involving an expenditure of £5,500,000, has been introduced into Parliament. Of this total about £1,000,000 is to be devoted to the provision of defences for Berehaven, Lough Swilly, the Scilly Islands, and Falmouth—that is for Naval purposes. Increase in Naval expenditure

The increase in the Navy Estimates and the Naval Works Bill were generally approved by the country at large. The year had opened with our relations strained with both Germany and the United States. As soon as these misunderstandings were in a fair way of being removed, public feeling was again aroused by the continuance of the Armenian massacres, and the Government was urged to take steps which would have led to imminent risk of war with Russia, and possibly France as well. The increase in taxation for Naval purposes has also happened to coincide with a revival of material prosperity generally approved.

* A further sum of £507,000 is provided for the Navy in the supplementary estimate presented to Parliament in February, 1897, *cf.* 422.

and a Budget surplus, so that the burden has been but little felt by the general body of taxpayers. Under these circumstances, it is not surprising that the money required for Naval purposes was readily voted.

There has been no apparent weakening during the past year in the public determination to retain, at all costs, the command of the sea, but it would be unwise on the part of those responsible for the defence of the Empire to take full advantage of the present state of public feeling. At a time when the revenue is falling, when trade is less prosperous, or when the political atmosphere is less clouded, there is certain to be a reaction, and demands will assuredly be made for a reduction in the expenditure of our great spending departments. Unless some check is put on the tendency to be lavish in the hour of prosperity there may be danger to our Naval supremacy in the future. This solemn warning looks strange on the opening pages of a book which has always been devoted to urging the needs of the Navy on the attention of the country. It is given after the most deliberate consideration.

Ships completed.

The number of ships completed during the year 1896–97 considerably exceeds the number completed in any previous year since 1893–94, when eight battleships, six first-class cruisers, three second-class cruisers and ten torpedo-gunboats were added to the Navy. Three battleships, one first-class cruiser, seven second-class cruisers, one third-class cruiser and ten torpedo-boat destroyers have been completed.* The result of the increase to the votes for new construction during the last years of Earl Spencer's administration is now being shown in the large addition made to the number of available ships.

Prince George. Victorious.

First in importance of the vessels completed during the past year are the Prince George and Victorious—of the now well-known Majestic class. The Prince George was laid down at Portsmouth on 10th September, 1894; was launched on 22nd August, 1895, and was completed in October, 1896. She is now in commission in the Channel Squadron. The Victorious was laid down at Chatham on 18th May, 1894, was launched on 19th October, 1895, and is ready for sea. The Majestic and Magnificent were completed within two years from the date of the laying of their keel plates. There has been little falling off in the rate of construction for the newer ships. "The propelling engines of the Prince George are of the same type and dimensions as those fitted by Messrs. Humphrys, Tennant and Co., to the battleships Hood, Royal Sovereign, Repulse, and

* Navy Estimates, 1897–8. In the Estimates for 1896–7 it was proposed to complete the Terrible, the Arrogant, and twenty destroyers, in addition to the above.

Empress of India. They are of that firm's well-known make of three-cylinder inverted triple-expansion twin-screw type, having cylinders 40 in., 59 in., and 88 in. diameter with a piston stroke of 51 in., to develop 10,000 under natural and 12,000 I.H.P. under forced draught. The steam is supplied by eight cylindrical four-furnaced Scotch boilers, having a total heating surface of 24,400 square feet, and worked at a pressure of 155 lb. per square inch."—*Engineer*. The propelling machinery and boilers of the Victorious are of similar type and were constructed by Messrs. Hawthorn, Leslie and Co.

The three sets of trials of both ships were satisfactory. For the purpose of comparison the results of the trials of the Majestic and Magnificent, as well as of the Jupiter not yet completed, are also given:— Steam trials of.

EIGHT HOURS' NATURAL DRAUGHT TRIALS.

	Mean Draught.	Air Pressure.	Mean Revolutions.	Total I.H.P.	Speed by Log.
Prince George	25 ft.	·44 in.	97	10,464	16·52
Victorious	25 ft, 8 in.	·26 in.	98·6	10,316	16·92
Majestic	25 ft.	—	100·5	10,418	16·9
Magnificent	24 ft. 11½ in.	—	96	10,301	16·5
Jupiter	—	—	—	10,258	15·8

FOUR HOURS' FORCED DRAUGHT TRIALS.

	Mean Draught.	Air Pressure.	Mean Revolutions.	Total I.H.P.	Speed by Log.
Prince George	25 ft.	1·2 in.	101·7	12,253	18·3
Victorious	25 ft. 2 in.	1·25 in.	105·3	12,201	18·7
Majestic	—	—	106	12,097	17·9
Magnificent	24 ft. 8½ in.	·9 in.	100·3	12,157	17·6
Jupiter	25 ft. 10 in.	—	—	12,475	18·4

THIRTY HOURS' COAL CONSUMPTION TRIALS.

	Mean Draught.	Coal consumption per I.H.P. per hour. lbs.	Mean Revolutions.	Total I.H.P.	Speed.
Prince George	24 ft. 9 in.	1·83	82·9	6185	14·7 (pt. to pt.)
Victorious	25 ft. 1 in.	1·6	86·9	6205	14·9 (by log.)
Majestic	—	1·84	85	6075	—
Magnificent	—	1·67	83	6086	—
Jupiter	24 ft. 7½ in.	1·5	—	6193	14·1

It will be interesting, as showing the performances of these ships after being some time in commission, to note the results of a series of progressive trials carried out by the Majestic in October last. On the natural draught trials in Stokes Bay the speed with 7010 I.H.P. was 14·3 knots, and with 10,083 I.H.P. 16·09 knots. On the forced draught trial three runs were made on the measured distance of 23 miles on the Cornish coast. The mean speed obtained was 16·85 knots, with a mean of 103·1 revolutions and 11,795 I.H.P.

The following description of the gunnery trials of the Prince George and of certain modifications in the training and loading arrangements is taken from the *Times*:— Gunnery trials.

"The guns were trained to various degrees of elevation, and the firing was both ahead and astern, as well as abeam. The practice was very good, most of the shots going very close to or hitting the target. The last two rounds from each barbette were fired simultaneously. The testing of the twelve 6-in. guns consisted of two rounds being fired from each gun on various bearings. Four rounds were also fired from each of the sixteen 12-pdr. guns on different bearings, and a similar number from the guns mounted in the tops. There are eight Maxim guns on board, and these were tested by fifty rounds being fired from each. The whole of the firing from the secondary armament was at targets, and in this case the results were also most satisfactory. . . . The special features of the gun mountings adopted are the ease and rapidity with which they can be operated by hydraulic, electric, or hand power; and the tests demonstrated that they had practically become rapid-firing mechanisms and mountings. . . . The gun and mounting (when the gun is in the firing position) balance about trunnions fitted to the slides, which admit of the gun being elevated or depressed with comparative ease by hand. The main system for working the guns and mountings is hydraulic, but as an alternative hand gear is provided, both for revolving the turntables and otherwise working the guns. It was determined after the trials of the Majestic to fit electric motors to assist the hand training gear, and this modification has been adopted more or less as an experiment in the Prince George, where each turntable will have one 5 horse-power motor arranged in such a manner that it will greatly assist the turning by hand. Also in the hand elevating gear for the guns a 2½ horse-power motor has been arranged to work the elevating pump.

Loading arrangements.

"Another feature of the design common to the Majestic, Magnificent, and Prince George is the alternative loading arrangements. A central hoist revolving with the turntable admits of powder charges being brought up to the gun in any position, and a store of projectiles in the gun-house enables the guns (or either of them independently of the other) to be loaded and fired without the loss of time necessitated by having to return to a fixed loading position. Certain details of the method of raising the powder charge are, however, new in the Prince George. A high-speed hydraulic motor (running at about 450 revolutions a minute) is fitted in the central trunk and raises a brass case containing the powder from the magazine to the gun-house in about 15 seconds. Two cases are provided and so arranged that one travels up while the other descends. Thus in the space of a little more than half a minute a charge for each gun can be raised from the magazine."

In connection with the question of ammunition supply the following remarks, which are condensed from the *Engineer*, will be of interest :— Ammunition supply.

"The total quantity of gun ammunition carried in the shell-rooms and magazines of the Prince George is 14,120 rounds for the 12-in., 6-in., 12-pdr., and 3-pdr. guns. We may place the total weight of *service* ammunition, inclusive of that of the metal cartridge-cases, at a figure of about 335 tons. When we contrast this with the weight of powder, shot, and shell carried *for the main armament alone* of such vessels as the Howe or Camperdown, the result is very striking, the latter amounting to 300 tons, independently of what is required for the secondary and minor batteries contained in these ships. The reason for this actual reduction in the weight of the ammunition carried upon the Prince George, whilst, on the other hand, the number of rounds for the quick-firing guns has been enormously *increased*, is to be found, not so much in the decrease of the calibre of the four heavy guns from 13·5 in. to 12 in., but in the change in the character of the charge, cordite having replaced gunpowder as the service propellant. The full charge of powder for the 12-in. breech-loading rifled gun was 295 lbs. ; this, when replaced by cordite, only required 167½ lb. of the new propellant to do the same, or, in point of fact, a great deal more work. Hence, without increasing the aggregate amount of weight in the magazines, shell-rooms, and ready racks, but actually reducing it to an appreciable extent, the introduction of cordite has admitted of the number of rounds of important secondary weapons being raised to 200 and 300 per gun.

"The weight of metal thrown by five minutes' fire from one broadside of the Prince George, either to port or starboard, would be as follows :— Weight of broadside, etc.

	Rounds in Five Minutes.		
	From one gun.	Total No.	lb.
Four 12-in. guns . . .	4	16	13,600
Six 6-in. guns	25	150*	15,000*
Eight 12-pr. guns. . .	50	400	4,800
Eight 3-pr. guns . . .	75	600	1,800
			35,200
			Or 15⅝ tons.

"The weight of metal thrown axially, in a line with the keel, either forward or aft, is as follows :—

	Rounds in Five Minutes.		
	From one gun.	Total No.	lb.
Two 12-in. guns . . .	4	8	6800
Two 6-in. guns . . .	25	50	5000
Two 12-pr. guns . . .	50	100	1200
Four 3-pr. guns . . .	75	300	900
			13,900 or 6 tons.

* These figures are given as 125 and 12,500 in the *Engineer*, an obvious slip.—Ed.

"It may be asked whether the 6-in. quick-fire gun can really maintain an effective rapidity of five rounds per minute. In this connection we may remark that from one of the main deck casemate 6-in. guns of the Royal Arthur, whilst stationed in the North Pacific, twelve rounds were fired at a target 2000 yards off in two minutes, the result being *ten hits!* Probably in action with an enemy the firing would not be quite so good, but there is no reason whatever to believe that it would be less rapid."

Renown.

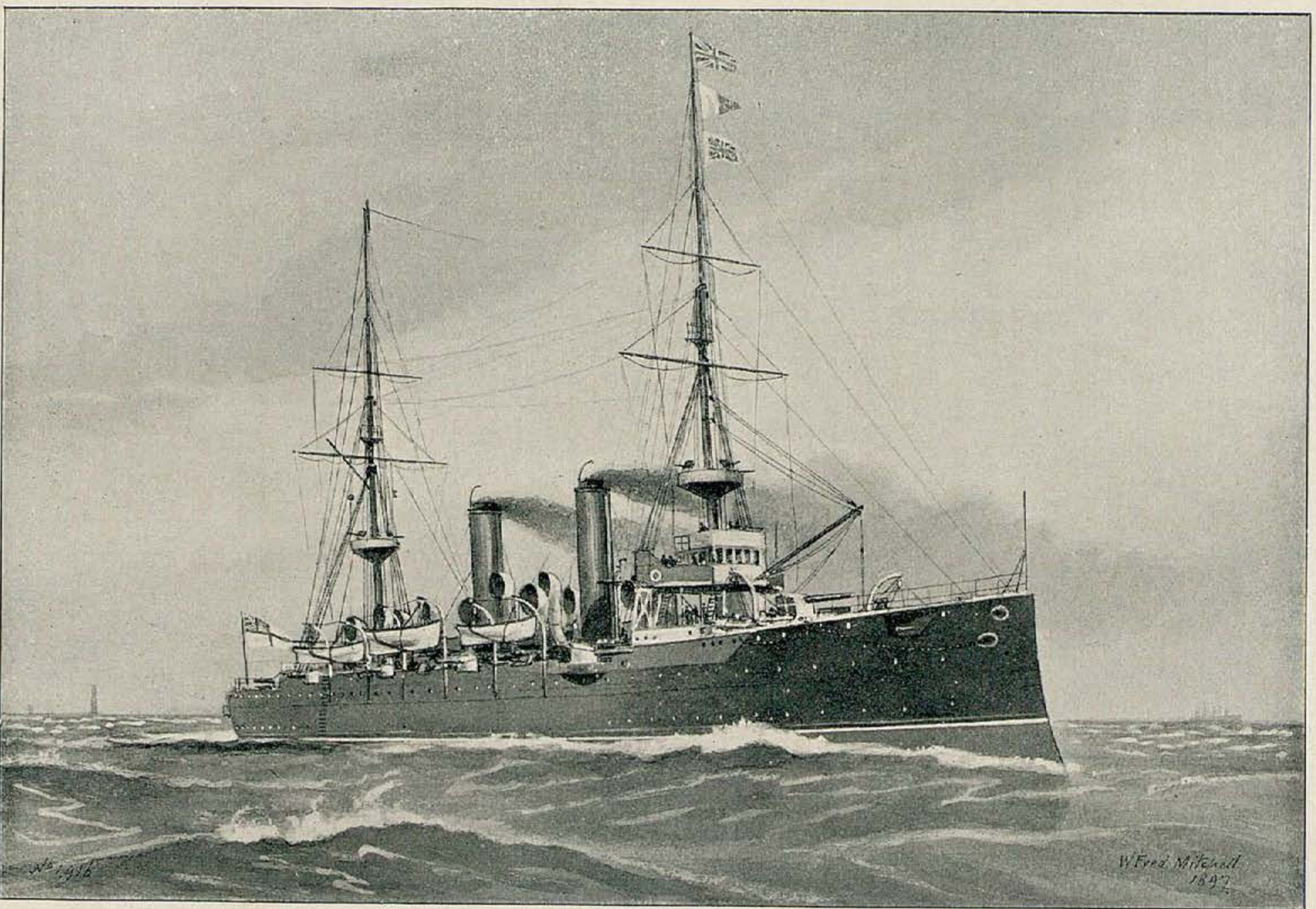
The Renown was laid down at Pembroke in February, 1893, was launched in May, 1895, and is ready for sea. She is of 12,350 tons displacement, and her estimated speed with 12,000 horse-power was 18 knots. She is protected on the same principle as the Majestic class, but the thickness of the barbette armour is 10 in. as compared with 14 in., and of the side armour 8 in. and 6 in. as compared with 9 in. throughout. The main armament consists of four 10-in. guns compared with four 12-in. guns. All the 6-in. Q.-F. guns are mounted in casemates, as on the Majestic, but only ten are carried instead of twelve. The cost of the Renown, excluding guns, is £704,747; the Majestic and Magnificent have cost £911,000 apiece, but the remaining ships of the class are estimated to cost somewhat less. Great interest was attached to the trials of the Renown, as she was expected to prove herself the fastest battleship afloat. This she has succeeded in doing by a very narrow margin over the Victorious, but the latter was tried at considerably less than her load draught. The machinery of the Renown is by Messrs. Maudslay, Sons and Field. The following are the results of the trials:—

	Air Pressure.	Mean Revolutions.	Mean I.H.P.	Speed.
8 hours' natural draught .	·27 in.	97·8	10,708	17·9
4 hours' forced draught. .	1·7 in.	104·5	12,901	18·75

On the thirty hours' coal-consumption trial the mean draught was 26 ft. 9 in., and the mean speed 15·3 knots in the 6189 horse-power, and 86·9 revolutions. The consumption of coal was 1·88 lbs. per I.H.P. per hour. On the gunnery trials the 10-in. barbette guns were fired thirty degrees before or abaft the beam, as the case might be. They were also fired simultaneously directly fore and aft, with full charges and at thirty-five degrees elevation without injuring the ship or the mountings.

Powerful and Terrible.

The monster cruisers Powerful and Terrible of 14,200 tons displacement have passed successfully, though, as was to be expected, after a good many difficulties, through their trials. The Powerful was launched at Barrow on 28th May, the Terrible at Messrs. Thomson's yard on 27th May, 1895, the propelling machinery being made by



H.M.S. "ECLIPSE."

the builders in each case. Both ships are completing for sea at Portsmouth Dockyard. They quite dwarf the Cæsar, which is completing in the same basin. Very great interest attached to the trials because both ships are fitted with Belleville water-tube boilers, which had been previously employed in the British Navy only for the torpedo-gunboats Speedy, Sharpshooter, and Spanker. It is estimated that a saving of 400 to 500 tons has been effected by the adoption of this type of boiler. The Powerful and Terrible were described at length in the *Naval Annual* last year, and, as their trials are dealt with in a later chapter, we need only give the results here. The Admiralty requirements from the contractors were (1) that each ship should make a trial of thirty hours' duration, at 5000 I.H.P. and 18,000 I.H.P. respectively, to ascertain the coal consumption at these powers, and (2) that each ship should steam for four consecutive hours, the engines developing continuously 25,000 horse-power, and immediately afterwards for another four consecutive hours, the engines developing continuously 22,000 horse-power.

	Mean Draught.	Mean Revolutions.	Total I.H.P.	Speed.	Coal consumption per I.H.P. per hour.
	1. Thirty Hours, 5000 Horse-Power.				
Powerful . .	27 ft. 2 in.	67·2	5003	14·33	2·07
Terrible . .	—	64·5	5111	13·43	2·57
	2. Thirty Hours, 18,000 Horse-Power.				
Powerful . .	27 ft. 2 in.	102·8	18,433	20·6	1·84
Terrible . .	27 ft. 5 in.	102·7	18,493	20·964	1·71
	3. Four Hours, 25,000 Horse-Power.				
Powerful . .	27 ft. 2 in.	114·4	25,886	21·8	
Terrible . .	27 ft.	112	25,572	22·41	
	4. Four Hours, 22,000 Horse-Power.				
Powerful . .	27 ft. 2 in.	109·5	22,634	not recorded.	
Terrible . .	27 ft.	108·8	22,282	"	

The strong wind in which the four hours' full-power trial was made is given as the reason why the Powerful did not attain her designed speed.

Second-class cruisers.

Seven of the nine second-class cruisers of the Eclipse type will have been completed by the end of the financial year 1896–97. The Dido and Isis will not be ready for sea till the coming summer. It is unnecessary to repeat the detailed description of these vessels. The displacement is 5600 tons, and the estimated speed, with 9600 horse-power, is 19·5 knots. The armament comprises five 6-in., six 4·7-in., and eight 12-pdr. Q.-F. guns. The armament is weak for a ship of this size, and the designed speed is unsatisfactory, though in most cases this has been exceeded on trial. The following are the

results of their several trials, which have been gleaned from the *Times*, the *Engineer*, and other sources :—

EIGHT HOURS' NATURAL DRAUGHT TRIAL.

	Mean Draught.	Air Pressure.	Mean Revolutions.	Total I.H.P.	Speed by Log.
Diana . .	20 ft. 6 in.	—	136·2	8252	19·72
Doris . .	—	—	140	8391	19·1
Eclipse . .	20 ft. 6 in.	·39	134·7	8220	19·2
Isis . . .	20 ft. 6 in.	·41	136·2	8208	19·8
Juno . . .	—	·42	138·45	8272	18·8
Minerva . .	—	—	—	8221	19·6
Talbot . .	20 ft. 6 in.	·41	132·5	8462	19·2
Venus . .	20 ft. 3 in.	—	136·9	8290	19·25

FOUR HOURS' FULL POWER TRIAL.

	Mean Draught.	Air Pressure.	Mean Revolutions.	Total I.H.P.	Speed by Log.
Diana . .	20 ft. 6 in.	1·29	146	9875	20·16
Doris . .	—	1·1	150·8	9851	20·1
Eclipse . .	20 ft. 2 in.	·94	141·77	9853	20·1
Isis . . .	—	—	145	9840	20·1*
Juno . . .	20 ft. 9 in.	·92	149	9771	20
Minerva . .	20 ft. 1 in.	1·02	137·6	9891	20·34
Talbot . .	—	1·06	139·5	9766	20
Venus . .	20 ft. 6 in.	1·34	146·15	9774	20·18

THIRTY HOURS' COAL CONSUMPTION TRIAL.

	Mean Draught.	Mean Revolutions.	Total I.H.P.	Speed.	Coal consumption per I.H.P. per hour.
Diana . .	—	116·1	4916	17·24	1·47
Doris . .	—	118·7	4938	16·5	1·47
Eclipse . .	20 ft. 2 in.	116	4838	16·8	1·83
Isis . . .	20 ft. 3½ in.	117·8	4925	17·5	1·6
Juno . . .	—	119·4	4863	16·1	1·64
Minerva . .	19 ft. 10 in.	111·6	4919	17·52	1·7
Talbot . .	—	114·2	4913	16·68	1·84
Venus . .	—	118·05	4876	16·8	1·6

The Talbot has been commissioned for service on the North American Station. The Minerva is taking relief crews out to the China Station.

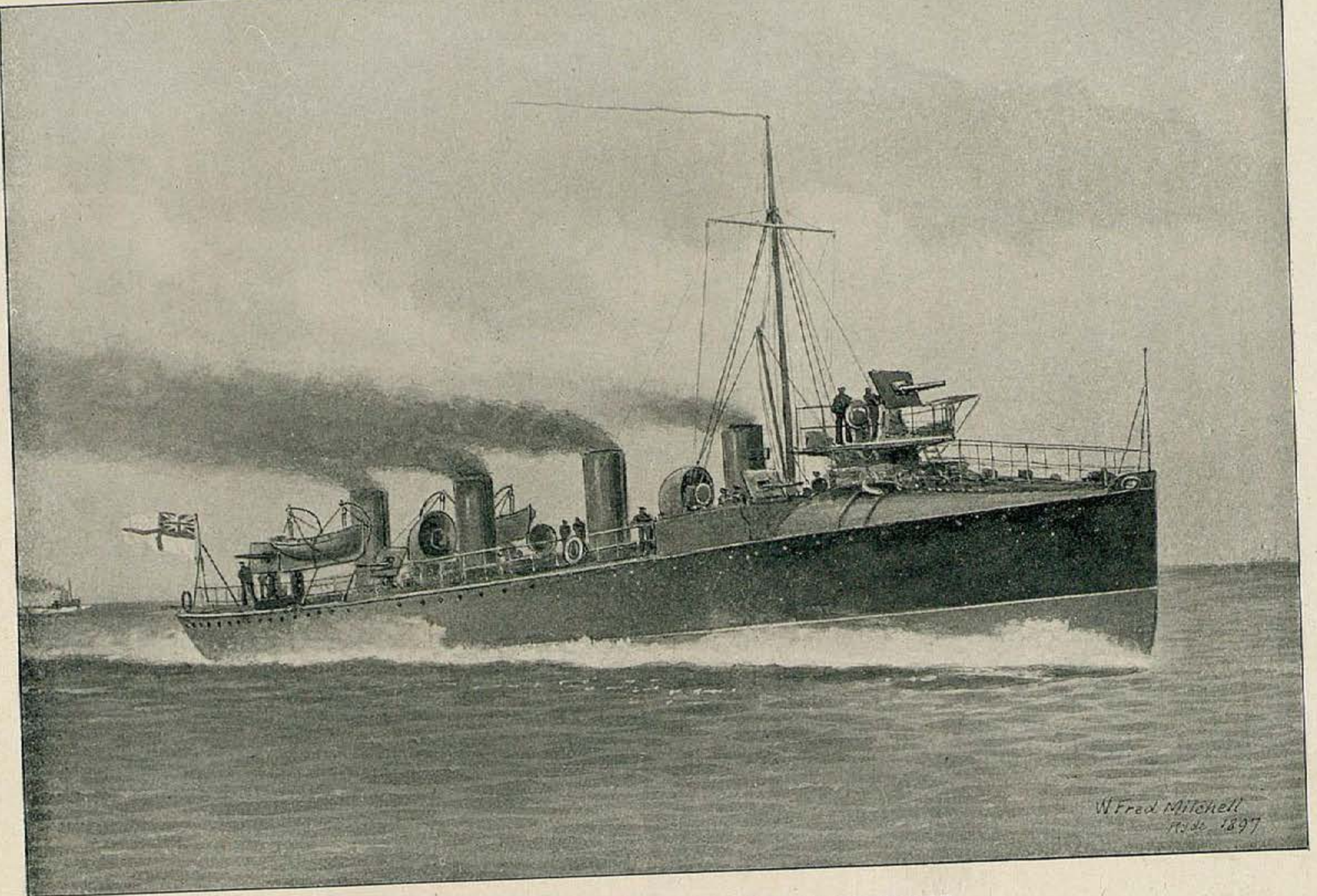
Pelorus.

The third-class cruiser Pelorus (2135 tons), which was launched at Sheerness Dockyard in February, 1896, has been completed. Her engines are by Messrs. Thomson, of Clydebank, and were designed to develop 5000 horse-power with natural and 7000 horse-power with forced draught, the stipulated speed being 20 knots. The boilers are of the Blechynden type. On the forced draught trial a speed of 20·75 knots was obtained with 7028 horse-power.

Torpedo-boat destroyers.

Seventy torpedo-boat destroyers had been ordered before March 31st, 1896 ; twenty more have been ordered during the year 1896–97, making a total of ninety vessels of this useful type. The forty-two earlier destroyers had a contract speed of 26 or 27 knots. These speeds were frequently exceeded on trial, but in six cases the contractors have had a difficulty in realising the contract speed. Of the later destroyers, forty-five have a contract speed of 30 knots, three of

* Given in the *Times* as 21·1, which I have taken to be a misprint.—ED.



THIRTY-KNOT TORPEDO-BOAT DESTROYER.

BUILT BY MESSRS. LAIRD.

32 to 33 knots. It was estimated that thirty would be completed during the current financial year. As already mentioned, only ten are ready; fifty are to be completed during the coming year. We give below the particulars of some of the trials not already published in the *Naval Annual*:—

Name.	Builders.	Revolutions on miles.	Mean of 6 runs on measured mile.	Mean speed, 3 hrs.
Desperate	Thornycroft	403·3	30·428	30·018
Quail	Laird	374	30·385	30·039
Sparrowhawk	Laird	364	30·207	30·56
Thrasher	Laird	362	30·000	30·015
Virago	Laird	364	30·365	30·049
Fame	Thornycroft	394	30·155	..
Star.	Palmer	..	31·05	..

The dimensions of the four boats built by Messrs. Laird are 213 ft. by 21 ft. 6 in. The contract speed was 30-knots with 6000 horse-power. The coal capacity is ninety tons, which gives a radius of action of about 3500 knots at 13-knot speed. The armament consists of one 12-pdr. and five 6-pdr. Q.-F. guns and two torpedo-tubes. The complement is sixty-five officers and men. On all trials these boats carry a load of thirty-five tons. The Express, building by the same firm, is to be supplied with engines capable of indicating 10,000 horse-power, the contract speed being 33 knots. The twenty new destroyers ordered vary in length from 210 ft. to 215 ft., and in beam from 19 ft. 6 in. to 21 ft. 6 in.

Ships under construction. We now turn to the progress of ships still in course of construction. The most important of these are the five remaining battleships of the Spencer programme. Of these, the Jupiter, laid down April 26th, 1894, was launched at Messrs. Thomson's yard, at Glasgow, December 18th, 1895. The Mars, laid down June 2nd, 1894, was floated out of Messrs. Laird's dock, at Birkenhead, on March 31st, 1896. The Hannibal, which was laid down at Pembroke on May 1st, 1894, was launched in April, 1896. The Illustrious, laid down at Chatham, March 11th, 1895, was floated out of dock September 17th, 1896. As in the Magnificent, the boilers will be fitted for induced draught. The Cæsar, which was laid down at Portsmouth, March 25th, 1895, was floated out of dock on September 2nd, 1896. The Jupiter and Mars were delivered at the dockyards in February, 1897, five months before the contract time, and will be ready for sea in the summer. The Hannibal, Illustrious, and Cæsar will be completed in the autumn.

Four cruisers of 11,000 tons displacement were laid down in

First-class cruisers. Diadem class.

1895–96, and were described last year. The armament consists of sixteen 6-in. Q.-F. guns—twelve of which are mounted in casemates—fourteen 12-pdrs., and twelve 3-pdrs. The estimated speed with 16,500 horse-power is 20½ knots. Steam will be supplied by thirty water-tube boilers of the Belleville type. The Diadem was launched at the Fairfield yard on 2nd September, 1896, having been built in 214 working-days, or less than thirty-six weeks—a most creditable performance. The Niobe is building at Barrow, the Europa at Messrs. Thomson's, and the Andromeda at Pembroke.

Second-class cruisers.

Three of the four second-class cruisers of 5800 tons displacement have been launched—the Arrogant at Devonport, in May, the Furious at Devonport, on December 3rd, and the Gladiator at Portsmouth, on December 8th. The Vindictive at Chatham will probably be launched in July. The special feature in the construction of these vessels is that their bows have been specially strengthened for ramming, the form of the vessel under water being designed to give rapid manœuvring power. There are eighteen boilers of the Belleville water-tube pattern. The foremast will be fitted with a fighting top. The dimensions and other particulars, as compared with those of the Astræa class and one or two foreign cruisers of about the same displacement, are given in the following table :—

——	Arrogant.	Astræa.	Ersatz Freya.	Pothuau.	Buenos Aires.
Displacement . tons	5800	4360	5650	5360	4740
Length	320 ft.	320 ft.	344 ft. 6 in.	370 ft. 6 in.	396 ft.
Beam	57 ft. 6 in.	49 ft. 6 in.	57 ft.	50 ft. 2 in.	47 ft.
Draught	21 ft.	19 ft.	21 ft. 6 in.	21 ft.	19 ft.
I.H.P.	10,000	9000	10,000	10,000	14,000
Speed . . . knots	18·5 to 19	19·5	21	19	23·2
Armament * . .	4 6-in. 6 4·7 in. 8 12-pr. 3 3-pr.	2 6-in. 8 4·7-in. 8 6-pr. ..	2 8·2-in. 8 5·9-in. 10 3·4-in. 10 smaller	2 7·4-in. 10 5·5 in. 18 smaller ..	2 8-in. 4 6-in. 6 4·7-in. 24 smaller
Protection :—					
Deck	1½″–3″	2″–1″	4″	3⅜″–2″	1″–5″
Belt	..	..	..	3⅜″	..
Gun positions . .	..	..	4″	9½″	4½″
Coal supply . . .	500	400	500	538	1000†

* All the guns are Q.F. with the exception of the 7·4 in. guns of the Pothuau, and possibly the 8·2 in. guns of the Freya.

† Coal that can be carried in bunkers.

The Arrogant class have two submerged torpedo tubes. Considering their displacement, they are lamentably weak in armament, and their speed is inferior to that of their predecessors in the British Navy, as well as to that of the most modern cruisers. The coal supply given in the table for all except the Buenos Aires is the

coal carried at load draught, but there is no doubt that the bunker capacity of the Arrogant is at least 1000 tons. The Elswick cruisers Yoshino and Buenos Aires, which are considerably smaller than the Arrogant, carry as powerful an armament and have a speed of 23 knots. Speed is one of the principal requisites for a cruiser, provided that gun-power is not altogether sacrificed to it, as is the case in the Columbia and Minneapolis. The Arrogant is expected to be ready for sea in the summer.

Proserpine. The third-class cruiser Proserpine, laid down on 2nd March, 1896, sister ship to the Pelorus, was launched on 5th December, and is completing at Sheerness Dockyard. The propelling machinery is being made at Keyham. She will be fitted with triple-expansion engines and water-tube boilers.

Ships laid down. Battleships. A considerable number of ships have been laid down during the past year. In the last number of the *Naval Annual* we urged that, in view of the construction going on abroad, a new programme of battleship construction must be taken in hand. Five battleships have been laid down during the year 1896–97, and it is proposed to lay down four more battleships during the year 1897–98. The Canopus, which gives her name to the class, and the Goliath were laid down on 4th January, 1897, at Portsmouth and Chatham respectively. The former will be engined by the Greenock Foundry Company, the latter by Messrs. Penn. The Glory is being built and engined by Messrs. Laird Bros.; the Ocean, building at Devonport, is to be engined by Hawthorn, Leslie and Co., and the Thames Ironworks are building the Albion, for which Messrs. Maudslay, Sons and Field undertake the engines. The following table shows the dimensions of the Canopus class as compared with those of the Majestic class and the Renown:—

——	Renown.	Canopus Class.	Majestic.
Displacement	12,350 tons	12,950 tons	14,900 tons
I.H.P.	12,000	13,500	12,000
Speed	18 knots	18·25 knots	17·5 knots
Length	380 ft.	390 ft.	390 ft.
Beam	72 ft.	74 ft.	75 ft.
Draught	26 ft. 9 in.	26 ft.	27 ft. 6 in.
Protection:—			
Belt	8″–6″	6″	9″
Gun positions	10″ and 6″	12″ and 5″	14″ and 6″
Deck	3″–2″	3″–2″ (?)	4″–2½″
Coal supply at load draught	800	800	900
Armament	4 10-in. 10 6-in. Q.F. 8 12-pr. 12 3-pr.	4 12-in. 12 6-in. Q.F. 12 12-pr. 6 3-pr.	4 12-in. 12 6-in. Q.F. 16 12-pr. 12 3-pr.

Canopus. The main and secondary armaments are distributed in the same way as in the Majestic class. Of the 12-pdr. Q.-Fs. six will be mounted on the upper deck and four on the main deck, the remaining two being for boat and field service. There is one above-water tube astern and four submerged tubes. The weight of guns, mountings, and gunnery stores for each ship is about 1000 tons. Like the vessels of the Andromeda class and many French ships, "the Canopus class will have two protective decks, the 'turtle back,' which was originally designed to protect the vital parts of the ship, extending from end to end, while advantage is taken of the teaching of the battle of the Yalu by eliminating wood altogether from the main deck, which consists, from stem to stern, of two thicknesses of ½-in. steel. Whereas in the Majestic the armoured bulkheads are 14 in. and 9 in. thick and the barbettes 14 in. and 6 in., in the Canopus the armour on both the bulkheads and barbettes is 12 in. and 10 in. thick, and the armour on the casemates is 5 in. thick, whereas it is 6 in. in the Majestic. The bows of the Majestic are sheathed with about 9 in. of wood in order to facilitate plugging in the event of shot holes being made in the unarmoured parts; but in the Canopus these parts are protected by 2 in. of nickel steel to resist the entry of light projectiles. The ram is carried higher up than in the Majestic, the plan adopted in the Gladiator being followed, in order to deal a more effective blow immediately under the belt of an opposing ship." * The Goliath and the Canopus are to be ready for sea in twenty months. All these ships will be fitted with water-tube boilers. The above comparison will show that for a sacrifice of the thickness of protection we are obtaining in the Canopus class ships which are practically equal in offensive power and superior in speed to the Majestic, and which in offensive power are considerably superior to the Renown.

First-class cruisers. Four first-class cruisers of the Diadem class have been laid down. Three will be built by contract: the Argonaut, at Fairfield; the Ariadne, at Messrs. Thomson's yard; and the Amphitrite, at Barrow. The fourth is building at Pembroke Dockyard, and will be named the Spartiate. The dimensions are: length, 455 ft.; beam, 69 ft. The maximum horse-power is 18,000, which is expected to give these ships a speed of 20¾ knots, as compared with 16,500 horse-power and a speed of 20½ knots for the Diadem. Steam will be supplied from thirty Belleville water-tube boilers, the total weight of machinery and boilers being 1525 tons. The total coal capacity is 1900 tons, though the coal supply at load draught is only 1000 tons.

Second-class cruisers. Three new second-class cruisers of the Eclipse type have been ordered by contract: the Hyacinth from the London and Glasgow

* The *Times*.

Shipbuilding and Engineering Co., and the Hermes and Highflyer from Fairfield. Their dimensions are as follows:—Length, 350 ft.; beam, 54 ft.; mean draught, 20 ft. 6 in.; displacement, 5600 tons. The estimated speed is 20 knots, and the horse-power to be developed is 10,000 with natural draught. The coal capacity at load draught is 550 tons. The amount of coal which can be carried in the bunkers is presumably over 1000 tons. The armament consists of eleven 6-in. and fifteen smaller Q.-F. guns. In offensive power and in speed, these new second-class cruisers are an improvement on their predecessors.

Six third-class cruisers of the Pelorus type have also been laid down. The Pactolus, laid down in March at Elswick, was launched on 21st December, 1896; the Pomone has been laid down at Sheerness on the slip where the Proserpine was built; the Pegasus and Pyramus are building by Messrs. Palmer, of Jarrow; the Perseus and Prometheus by Messrs. Earle, of Hull. Third-class cruisers.

During the past year the first-class cruisers Edgar, Royal Arthur, and Aurora, the second-class cruisers Amphion and Leander, as well as the third-class cruiser Magicienne and some smaller vessels, have undergone an extensive refit, in the course of which the 6-in. B. L. guns have been replaced by Q.-F. guns, and the Nordenfelt by Q.-F. 3-pdrs. The speed obtained on trial by the Amphion was 16 knots, with 5105 horse-power. The Arethusa, sister ship to the Amphion, is being refitted. Refits.

The third-class cruiser Barham is receiving water-tube boilers of Thornycroft type, in place of the locomotive boilers with which she has been fitted. Over £41,000 is being spent on her refit, and a similar sum on that of the Bellona.

The torpedo-gunboat Spanker, which has been refitted with Du Temple water-tube boilers, on her forced draught trials attained a speed of 20 knots with 3920 horse-power and 3·59 in. air-pressure.

The First Lord, in his Memorandum explanatory of the Navy Estimates, states that seven battleships and eight cruisers have been re-armed with Q.-F. guns during the year. In connection with the work of replacing of 6-in. B. L. with converted 6-in. Q.-F. guns, which is being continued, the *Engineer* remarks: "Our converted quick-fire guns, so-called, are rather quick-loaders than quick-firers in the full sense, for while the pieces themselves have quick-action breech gear, their carriages do not provide for the 'pointer' keeping his eye on the sights throughout, and are at a serious disadvantage in speed of fire. This disadvantage, however, exists in many, if not most, foreign quick-fire pieces." Re-armament.

The progress of the *matériel* of the Navy must always occupy the *Personnel.*

main portion of this chapter, but the question of the manning of the Navy in time of war deserves fully as much attention at the present time. In spite of the large additions which have been made to the numbers voted in recent years, our resources for this purpose are still insufficient. In the Navy Estimates for 1897–98 it is proposed to add 6300 officers and men to the permanent force, bringing the total numbers voted up to 100,050. An increase of 100 officers and 1100 men is proposed to the Naval Reserve, which brings the number of officers to 1700 and of men to 25,300, or a total of 27,000. Including 6500 men in the seamen pensioners Reserve, the total numbers for whom provision is made in the Estimates are 133,645. Those responsible for the publication of the *Naval Annual* have consistently urged, both in these pages and elsewhere, that more attention should be paid to the development of our Reserves. The new regulations for the Reserve should certainly have the effect of making the force efficient. It is much to be regretted that a large addition to numbers is not proposed.

Supply of officers.

The supply of officers is possibly causing more difficulty than the supply of men. The entry of 100 officers direct from the mercantile marine on to a supplementary list of lieutenants and sub-lieutenants R.N. was a temporary solution, or rather mitigation, of the difficulty. The age of entry of Naval cadets into the Britannia was raised last year. For the future it is to be further raised and the course of instruction is to be shortened, a change which, it is anticipated, will ultimately produce about 170 sub-lieutenants each year, instead of 116 as at present. The addition of a year to the age of entry may possibly enable boys to join the Navy from the public schools. In connection with the training of Naval cadets, it may be remarked that the changes in the disciplinary arrangements on board the Britannia introduced by Captain Moore have had a satisfactory effect. The value of the two supplementary sources for the supply of officers for the Navy in time of war must gradually increase. For officers retired on half-pay—of whom there are 261 available for active service—courses of instruction have been instituted. The number of officers of the Naval Reserve who have served or are now serving for twelve months' training in the Navy is 183, as compared with 158 last year.

Training.

In connection with the question of training there seems to be some danger lest the tendency to exaggerate the value of scientific attainments, and to insist on courses of study in harbour ships, or schools on shore, as conditions of promotion for both officers and men is not being carried too far. Many officers believe that the "Acting Seamen Gunners," trained in a sea-going ship, are more efficient in their "specialty" than many of the draft which joins a

crew from one of the gunnery ships after a long period in harbour and on shore. Schools for signalmen have recently been established at Portsmouth and Plymouth. Men rated as qualified signalmen in these schools cannot be as efficient for the duties they have to perform as the men who have had a practical training in a sea-going squadron. A close imitation of foreign methods is not desirable in the British Navy.

Active operations.

The Navy has been engaged on active operations more than once during the past year. "On the death of Hamid Bin Thwain, the Sultan of Zanzibar, on 25th August, the palace was seized by Said Khalid, to whom the British Government had refused the succession in 1893. The Philomel and Thrush were at the time at Zanzibar, and on the 26th the Racoon and the St. George, the latter flying the flag of Rear-Admiral Rawson, arrived. The Admiral at once sent an ultimatum to the usurper demanding his surrender. A refusal led to the bombardment and destruction of the palace, the usurper flying to the German Consulate, whence he was transferred to German East Africa. The British vessels, though frequently struck by the enemy's shot, suffered few casualties. During the operations on the Nile the Navy was also represented, and a small gunboat flotilla rendered good service. Captain the Hon. Stanley Colville was wounded and has since been promoted, the Distinguished Service Order being given to Lieutenant Beatty, R.N., who also commanded a gunboat. The crews of these vessels, principally marine artillerymen, fully sustained the reputation of the Navy for dash and gallantry." * In January of the present year the services of the Navy were again called into requisition for the punitive expedition against Benin. Within a month of the massacre of the British officers and their followers, the Theseus and Forte, temporarily detached from the Mediterranean Squadron, the St. George, Philomel, Phœbe and other vessels from the Cape Squadron, with a small detachment under Colonel Bruce Hamilton sent from home—the whole force being under the command of Admiral Rawson—were on the spot. The complete success of the operations, though they cost several valuable lives, reflects great credit on the efficiency of the Navy; but the employment of the Navy on work which properly belongs to the Army is to be deprecated.

* *Army and Navy Gazette.*

CHAPTER II.

The Progress of Foreign Navies.

There is no event which stands out conspicuously in the Naval history of the year which has just closed. The Spanish Navy, which has been energetically employed in chasing the vessels which were supplying the Cuban rebels with arms and ammunition, is the only Navy except the British which has taken part in active operations. The meeting of the French Northern and the English Channel Squadrons in rough weather, while escorting the Russian Imperial Yacht with the Czar on board across the Channel, was a magnificent spectacle. The troubles in Crete have been the occasion for quite as formidable a gathering of warships in the Levant as was present at Kiel in 1895.

As regards shipbuilding policy it is not easy to see how it is possible to construct a good fighting machine fulfilling all the conditions of defensive and offensive power which are at present required without accepting a large displacement. Many recoil from the large expenditure which this necessitates, and believe that the Monitor type ought to be revived. On this point it may be observed that the Monitor type, dear though it ought to be to the Americans, has no place in their new fleet. Like all the principal Naval Powers, the United States are only building ships of high freeboard, capable of keeping the sea and having good accommodation for the crew. The partisans of modern Monitors do not deny that the ships which they contemplate would hardly be habitable, but they get over the difficulty by saying that such ships would be reserved for war purposes and for short manœuvres, and that the crews would be trained on special vessels. Such a system would be most unsatisfactory. The protected cruiser has lost ground, but, on the other hand, the torpedo-boat destroyer of 30 knots speed or over is in favour. Will this latter render the service expected of it? On this point there is a great difference of opinion. Some maintain that it would be preferable to sacrifice several knots speed to the strengthening the hull, to habitability, and to sea-keeping qualities, but the attraction of high speed is great.

In artillery high initial velocities are the principal characteristic of the new types of guns. The steel wire gun already in use in the English Navy is under trial in the United States. Other Navies do not appear to have any intention of adopting it. The calibre of Q.-F. guns is being increased. According to German technical newspapers, 8·2-in. and 9·4-in. Q.-F. guns are to form part of the armaments of the new battleships and cruisers.* Such progress as this has only been obtained by the employment of mechanical contrivances, a disadvantage which will probably become apparent in actual warfare. In a modern Navy such a variety of delicate machinery is employed that anything which tends to further complication should be accepted with considerable reserve. For working heavy guns the powers at present employed vary very greatly. We have hand-power, hydraulic-power, compressed air, steam and electricity. Of all these the most simple is manual power, but when it is necessary to employ machinery, recourse should be had, especially on board ships, to the power which is most easily controlled and the least complicated.

The question of explosives is amongst those which are arousing the most interest among Naval men. To pierce an armour-plate and to make the shell burst inside the ship after having completely penetrated the armour is the objective which the manufacturers of ordnance keep in view, but the secret of their experiments is, as a rule, carefully guarded. On the other hand, they are seeking to determine the minimum thickness of armour which will prevent shells bursting inside the ship. Several Powers have adopted howitzers, having a low initial velocity, as a part of the armament for certain ships. The object is to attack the enemy's deck, but it may be urged that such weapons can never be very accurate at ordinary fighting distance, and may be easily dismounted by guns of equal or smaller calibre having high initial velocity.

Most Naval Powers are employing multitubular, or water-tube boilers on their new ships. The advantages of this type are numerous, but, like all boilers, they require frequent and most careful overhaul if serious accidents are to be avoided. It is true that explosions are localised, and that repairs can as a rule be easily effected. The greatest danger arises from the action of the flames on the tubes which are directly exposed to them, and for this reason in the lower parts of the new boilers thicker tubes without welds should be employed. The best course to adopt is absolutely to forbid the use of all welded tubes.

* It is questionable whether guns of this calibre are justly entitled to be called quick-firers.—Ed.

France.

The revised Navy Estimates for 1897, as presented to the Chamber, amount to £10,333,495,* or £366,504 less than the Navy Estimates for 1896. Important reductions were made in the votes for new construction, and the votes for other services were increased at their expense. The amounts voted for new construction* for the last five years are as follows:—

1893	£3,724,228
1894	£3,858,542
1895	£3,725,195
1896	£3,617,179
1897	£3,191,849

Revised programme.

The additions to foreign Navies and the increase in the Colonial Empire have been used as arguments in the campaign for undertaking a new programme of shipbuilding. No mistake must, however, be made. France has no idea of possessing a Navy equal to that of England—all the speakers who took part in the Chamber of Deputies admitted the folly of such a policy—but she does wish to be in a position to make head against the forces of the Triple Alliance. In view of the programmes for the increase of the German and Italian Navies, France is about to make new sacrifices. The programme for 1897 of M. Lockroy's administration included the following ships to be laid down:—One first-class battleship, two first-class armoured cruisers, one first-class protected cruiser, one third-class cruiser, one gunboat, one torpedo-gunboat, one squadron torpedo-boat, and six torpedo-boats. This programme has been modified, and at present consists of the following ships:—One battleship to closely resemble the Henri IV., one armoured cruiser of the Jeanne d'Arc type, two first-class station cruisers, one third-class cruiser, one torpedo gunboat, one gunboat, and six first-class torpedo boats. Of the latter, two only will be ordered from private yards. The four others will be built at Cherbourg and Toulon, the principal headquarters of the defence flotillas. It has been thought desirable to adopt this policy in order to give additional training to the gangs of artificers who are employed on the numerous repairs of torpedo-boats. Before men can know how to repair a vessel they should know how to build one.

Administrative changes.

The past year has been marked by many changes in the internal administration of the Navy. Hardly any of the regulations adopted by M. Lockroy remain in force. The higher school of the Navy which was established on three cruisers has been suppressed and has been replaced by a school at Paris bearing the title École des Hautes

* These figures are on different basis to those given in the Comparative Statement of Expenditure.

Études Maritimes. To this school are admitted a dozen lieutenants and officers as free students. The lieutenants on leaving go through a short course in one of the Squadrons in Commission.

Petroleum is being used on French ships principally to increase the combustion of the furnaces. A 5·9-in. howitzer of military pattern with an initial velocity of only 1148 ft. has been tried on the torpedo-gunboat Dragonne. The trials were interrupted by the destruction of the ship used as a target, but they are to be resumed. It appears that the technical experts have only a limited confidence in the value of this weapon with its small initial velocity. Experience should show that a vessel armed with howitzers could only be employed for bombarding coast towns, a fact which has been long recognised.

Causes of excess in displacement. In the accounts of trials it will be seen that many ships have had to be modified owing to the fact that they were overloaded principally by their exaggerated superstructures. In order to understand how it has been possible to repeat such mistakes, the conditions under which the French Naval Constructor worked must be borne in mind. In the first place the plans after being drawn up by the Naval Constructors were overhauled by the Board of Construction (*Conseil de Travaux*), who frequently made great changes in them. Secondly, the carrying out of the plans was entrusted to the dockyards or to contractors, and was, as a rule, entirely out of the control of the designer. Moreover, under the pretext of introducing improvements during construction, the offensive and defensive powers of a ship were continually being increased. This involved additions in weight, and though each addition by itself was not important, their multiplication not only overloaded the ship but destroyed the harmony of the design. In trying to perfect the fighting machine it was made defective. It should be remarked that the ships built in private yards very rarely showed defects of this character. As every excess of weight entailed a pecuniary penalty the contractors paid great attention to the matter, and arranged to have some displacement in reserve.

Remedy. To remedy this vicious system a drawing office has been established in Paris, under the direction of M. Bertin, the distinguished Naval constructor. This office works out the designs of ships on the lines laid down by the general staff, overhauls and controls the designs coming from the constructors in the dockyards and private yards, and follows the course of the construction of a ship in all its stages. No alteration can be made in the design without its being consulted. It is at once an executive body and a board of permanent control.

Personnel In the Navy Estimates for 1897 the numbers voted are 1852

officers, and 39,846 warrant officers, petty officers, and seamen. The list of officers for the Navy has been modified by regulations passed during the course of last year. It now includes:—

15 Vice-Admirals,
30 Rear-Admirals,
125 captains,
215 commanders,
377 lieutenants—1st class,
377 „ 2nd class,
420 sub-lieutenants,
170 midshipmen,

and a number of cadets, varying according to the needs of the service.

The principal changes made by the new regulations are as follows:—1. The class of lieutenants who only serve on shore with free quarters has been abolished. 2. Midshipmen have the right to promotion after serving two years afloat. 3. Lieutenants having served fourteen years in that grade can retire with the pension of a "capitaine de corvette" (= a major in the army)—a pension which is intermediate between that of a lieutenant and that of a commander. It was hoped that a certain number of lieutenants would take advantage of this inducement to retire, but this object has not been attained. It is true that the steps taken to improve the position of the officers of this rank prevented the offer of an increased pension having the effect expected at the moment when the law was passed. For the last year lieutenants of fourteen years' seniority have been struck off the general list for service afloat. They only embark as second in command of third-class cruisers or on vessels which have a mess for the superior officers. To this mess they are admitted and no longer keep watch. All these measures are taken to give some satisfaction to the very deserving junior officers who are suffering from the slowness of promotion in the French Navy. The question of lowering the age for retirement for officers of all ranks is also under discussion. If the proposals of the Ministry of Marine are accepted by Parliament, the ages for retirement will be fixed as follows:—

Vice-Admirals	63
Rear-Admirals	60
Captains	58
Commanders	54
Lieutenants	50
Sub-lieutenants	45

Under the proposed regulations the number of lieutenants will be 800.

Ships launched. Bouvet.

The battleship Bouvet was launched at Lorient on the 27th April, 1896. Length 401 ft., beam 70 ft. 3 in., draught of water aft 27 ft. 6 in., displacement 12,205 tons. The Bouvet has three propellers, each driven by a vertical triple-expansion engine. The boilers are of the Belleville type and should develop 14,000 horse-power. The estimated speed with natural draught is 17 knots, and with forced draught 17·5 knots. The hull is subdivided into numerous compartments, and is protected by a complete water-line belt, 15¾ in. thick amidships, and 8 in. thick at the extremities. There are two armoured decks; the upper is 3½ in. thick and flush with the upper edge of the belt, the lower or splinter-proof deck is flush with the lower edge of the belt. The plates are of steel mixed with nickel and manganese. The armament of the Bouvet is remarkable, as much for its power and method of protection as for its distribution and the number of guns which can be fired ahead or astern. The main armament includes two 12-in. and two 10·6-in. guns of the 1893 model, all mounted in closed turrets; the two 12-in. guns forward and aft on the centre line, the two 10·6-in. guns on the broadsides. The turrets are protected by 13¾-in. steel armour, each turret containing only one gun. The breech-blocks are worked by hand. The top of the ammunition hoists is at the side of the gun, and the ammunition can be brought on a trolly, placed on rails on the floor of the turret, either to the breech of the guns or to the racks, which are capable of holding eleven rounds. The guns are elevated and trained by hydraulic power, which is replaced in the newest ships by electricity. The secondary armament consists of eight 5·5 in. and eight 3·9 in. Q.-F. guns. The 5·5 in. guns are mounted in closed turrets, protected by 3·9 in. armour, and so distributed that four can fire ahead and four astern. These guns are elevated by hand, and can be trained either by hand or hydraulic power. The 3·9-in. guns are perched on the superstructure on central pivot mountings, and are protected by 2·8-in. shields of hardened steel. The light armament comprises twelve 1·8-in. and twenty 1·4-in. Q.-F. guns, distributed on the flying deck, on the bridges and in the tops. There are four torpedo-tubes, two of which are submerged. The Bouvet was laid down on the 16th January, 1893, and should be completed by the end of 1897. She will cost, including armament, £1,100,785.

St. Louis and Gaulois.

The St. Louis and Gaulois are sister ships to the Charlemagne, which is being completed at Brest. The former was launched at Lorient on the 9th September, the latter at Brest on the 8th October, 1896. The Charlemagne was fully described in the *Naval Annual*

of last year. These ships have three propellers. They are of 11,275 tons displacement, and should steam 18 knots. The armament includes four 12-in. guns mounted in pairs in turrets, and ten 5·5-in. and eight 3·9-in. quick-firers. The complement is 631, of whom 31 are officers. The Gaulois and St. Louis are to be completed in 1899.

D'Entrecasteaux. The cruiser D'Entrecasteaux is being built at La Seyne from the designs of M. Lagane, who also designed the Jauréguiberry. Length between perpendiculars, 383 ft. 10 in.; length over all, 393 ft. 8 in.; beam, 58 ft. 6 in.; draught of water aft, 24 ft. 7 in.; displacement, 8114 tons; I.H.P., 13,500; speed, 19 knots. Protection is afforded by a deck with sloping sides 3·9 in. thick on the slopes, and by a splinter-deck below the first. The space between the two decks is minutely subdivided, and will contain the reserve of coal and stores. The propelling machinery consists of two vertical triple-expansion engines, steam being furnished by five cylindrical double-ended boilers. Four of these boilers are placed before the engines, the fifth abaft, between the shafts. Two hundred tons of oil will be carried to increase combustion in the furnaces. As in the case of the Capitan Prat and Jauréguiberry, electricity is the power used for all the auxiliary machinery, such as the steering engine, ammunition-hoists, and the machinery for turning the turrets. These engines are all placed below the armoured deck. The armament includes two 9·4-in. guns in closed and balanced turrets, one forward, the other aft, protected by 10-in. plates, twelve 5·5-in. and twelve 1·4-in. Q.-F. guns. There are six torpedo-tubes, two of which are submerged. Of the 5·5-in. guns, four are mounted amidships on the spar deck, firing ahead and astern, and eight are mounted in *échelon* in the upper battery, so that they can be fired in line with the keel. All are protected by 2·8-in. shields of hardened steel, and each gun has its own ammunition-hoist. There are two military masts. The normal coal supply is 650 tons, which can be increased to 1000 tons. This cruiser will go through her trials during the course of the present year.

Catinat. The Catinat has been launched at the Graville yard, near Havre. Length, 331 ft. 10 in.; beam, 44 ft. 8 in.; draught of water aft, 21 ft. 1 in.; displacement, 4065 tons. Two vertical triple-expansion engines, developing 7000 horse-power with natural, and 9000 horse-power with modified forced (*active*) draught, will give a speed of 19 knots. The boilers are of the Belleville type. Protection is afforded by an armoured deck 1 in. thick on the horizontal portion, 1·6 in. thick on the steepest portion of the slope, and 1·3 in. thick on the remainder. Above the protective deck the hull is minutely

subdivided, while below it there is a splinter-deck. The conning-tower is protected by 3·9-in. steel plates. The armament consists of four 6·2-in., ten 3·9-in., ten 1·8-in. and four 1·4-in. Q.-F. guns. The 6·2-in. guns are on sponsons. Originally it was intended to fit this vessel with four torpedo-tubes, but these have now been reduced to two, and both above water. The Catinat is sheathed with wood, and coppered, being destined for foreign service.

Cassard and D'Assas. The second-class cruisers Cassard and D'Assas have been launched, the first at Cherbourg, the second at St. Nazaire. They are sister ships to the Du Chayla, completing at Cherbourg, which was described last year. Displacement, 3952 tons. Speed, 19¼ knots. The armament consists of six 6·3-in., four 3·9-in., ten 1·85-in., eleven 1·46-in. Q.-F. guns and two torpedo-tubes. The coal capacity is 630 tons, and the radius of action 6000 miles at 10 knots.

Galilée. The third-class cruiser Galilée was launched at Rochefort on the 24th April, 1896. Length, 330 ft. 2 in.; beam, 34 ft. 6 in.; draught of water aft, 17 ft. 10 in.; displacement, 2317 tons. Two vertical triple-expansion engines, supplied with steam by Belleville boilers, are to develop 4000 horse-power with natural, and 6400 horse-power with forced draught. Speed, 20 knots. Like other ships of the class the Galilée is protected by an armoured deck with sloping sides. The armament consists of four 5·5-in. Q.-F. guns on sponsons; one 3·9-in. Q.-F. gun on the forecastle, and another on the poop, all protected by 2-in. shields; eight 1·8-in. and eight 1·4-in. quick-firers; and two above-water torpedo tubes. The crew number 248, of whom 11 are officers. With a coal supply of 226 tons, the Galilée can only steam 600 miles at full speed, and 3000 miles at 10 knots.

Henri IV. We stated last year that the battleship Henri IV. was to be laid down, but as her design was not then completed we could not give particulars. The principal characteristics are as follows: Length, 354 ft. 3 in.; beam, 72 ft. 9 in.; maximum draught, 23 ft.; displacement, 8948 tons. The ship will be fitted with three propellers driven by three vertical triple-expansion engines, to which steam will be supplied by Niclausse boilers, with 11,500 horse-power; the estimated speed is 17 knots. The coal capacity is 725 tons, which can be increased to 1100 tons. The radius of action at ten knots with 725 tons of coal will be 5000 miles, and with 1100 tons, 7500 miles. The armament comprises two 10·6-in. guns in turrets, one forward, the other aft; seven 5·5-in. Q.-F. guns, mounted in casemates; twelve 1·8 in. Q.-F. guns, and two submerged torpedo-tubes. The Henri IV. will cost £800,000, which appears to many naval officers a very high cost for a vessel only carrying two large guns. The other ships laid down in 1896 were described last year.

Programme of 1897.

We have already given the number and type of the vessels for which provision is made in the ordinary budget. Further additions will be made by the bill which the Marine Department is about to submit to Parliament. For the moment it is only possible to give information respecting those ships which are included in the ordinary budget.

A^3.

The battleship A^3 will be rather larger than the Henri IV. The plans are not yet completed.

C^3.

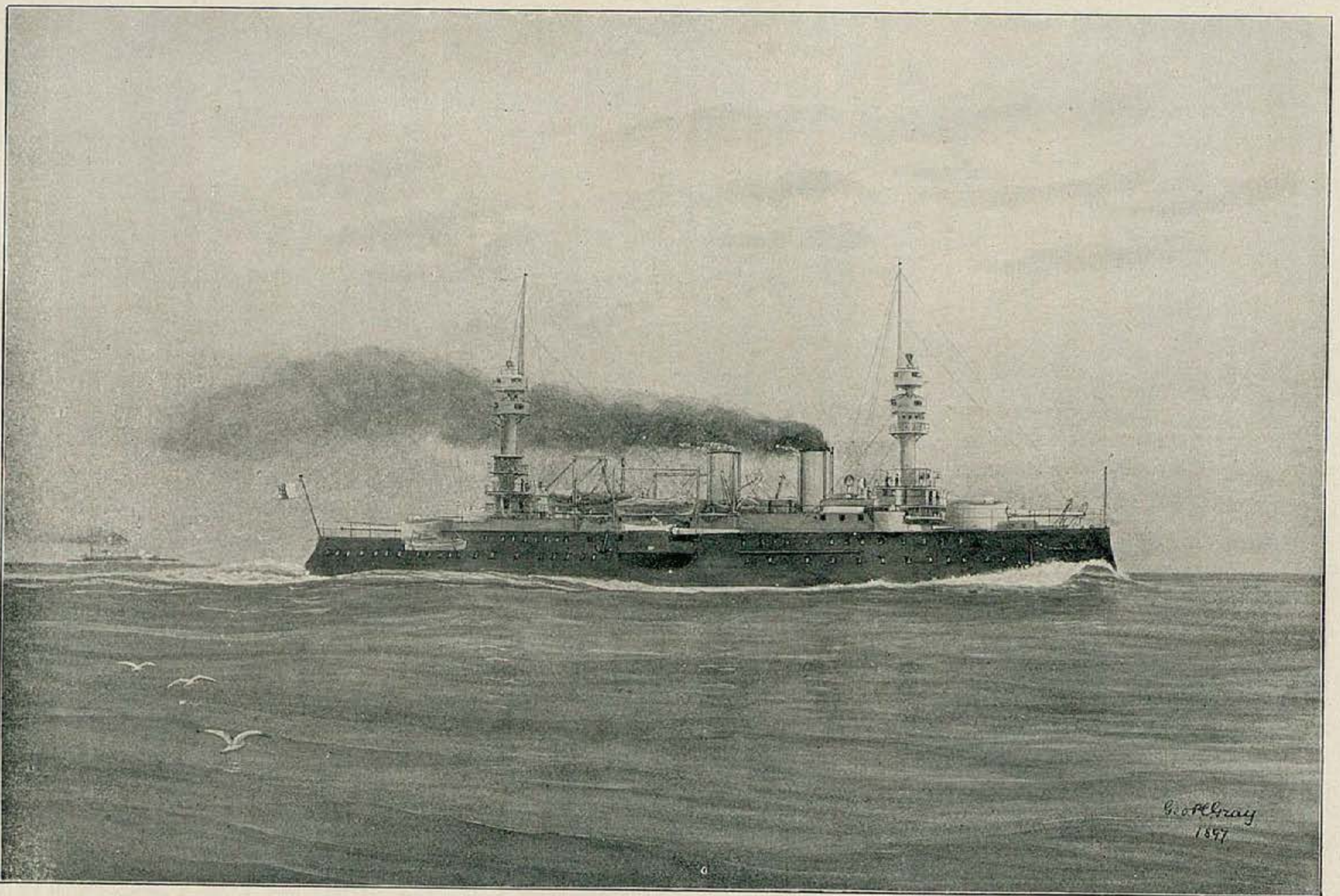
The armoured cruiser C^3 will be built at Toulon, alongside her sister ship the Jeanne d'Arc, particulars of which were given last year. Displacement, 11,270 tons; I.H.P. 28,000; three screws; speed 23 knots. There is a complete water-line belt 6 in. thick, with another belt of 3-in. plates above it. The normal supply of coal is 1400 tons, which can be increased to 2100 tons. In addition some liquid fuel will also be carried. At 10 knots, with 2100 tons of coal, the radius of action will be 13,500 miles; at full speed it will be 2000 miles. The armament consists of two 7·5-in., eight 5·5-in. twelve 3·9-in., besides lighter Q.-F. guns, several of which are to be replaced by Maxims. There are two submerged torpedo-tubes. The complement will consist of 586 men and 40 officers.

Station Cruisers.

One of the first-class station cruisers, to be called the Jurien de la Gravière, will be built at Lorient. Her principal dimensions are: Length, 440 ft.; beam, 48 ft. 6 in.; draught of water aft, 22 ft.; displacement, 5500 tons. Being intended for foreign service she will be sheathed with wood and coppered. She will be fitted with three propellers. The engines will be supplied with steam by Normand boilers, and should develop 17,100 horse-power, the estimated speed being 23 knots. The normal coal supply is 600 and the maximum 900 tons; the corresponding radii of action being 6000 and 9400 miles at 10 knots and 900 and 1300 miles at full speed. The armament comprises eight 6·2-in., twelve 1·8-in. Q.-F. guns and two submerged torpedo-tubes. A second cruiser of the same class will be built by contract. Her design is similar to that of the Jurien de la Gravière, but the displacement is different.

Infernet.

The third-class cruiser Infernet, ordered from the Chantiers de la Gironde, is a sister ship to the D'Estrées, building at Rochefort. She is sheathed with wood. Length, 311 ft. 8 in.; beam, 39 ft. 4 in.; maximum draught, 17 ft. 8 in.; displacement, 2452 tons. Two engines developing 8500 horse-power will drive two propellers. Speed, 20·5 knots. The normal coal supply, which is fixed at 345 tons, can be raised to 480 tons with the reserve bunkers full, but the vessel will then exceed her designed displacement. The armament includes two 5·5-in., four 3·9-in., besides smaller Q.-F. guns. There are no torpedo-tubes.



"JAUREGUIBERRY,"

FRENCH BATTLESHIP.

A station gunboat is to be built on the same lines as the Surprise, which was designed by M. Normand. Length, 184 ft. 8 in.; beam, 24 ft. 7 in.; maximum draught, 12 ft. 3 in.; displacement, 629 tons. There is a single screw driven by a horizontal triple-expansion engine. Speed, 13 knots. Armament, two 3·9-in., four 2·5-in., and four 1·4-in. Q.-F. guns. Surprise.

The design of a torpedo-gunboat or destroyer is in course of preparation. The boat will probably resemble the Durandal and the Hallebarde,* which M. Normand is building at Havre. These boats are designed to steam 26 knots with 4800 horse-power, and will be armed with one 2·5-in. and five 1·8-in quick-firers. The six torpedo-boats will be of 84 tons displacement, 1500 horse-power, and 23·5 knots speed. They will have only one screw, and will be armed with two 1·4-in. Q.-F. guns and two torpedo-tubes. Torpedo craft.

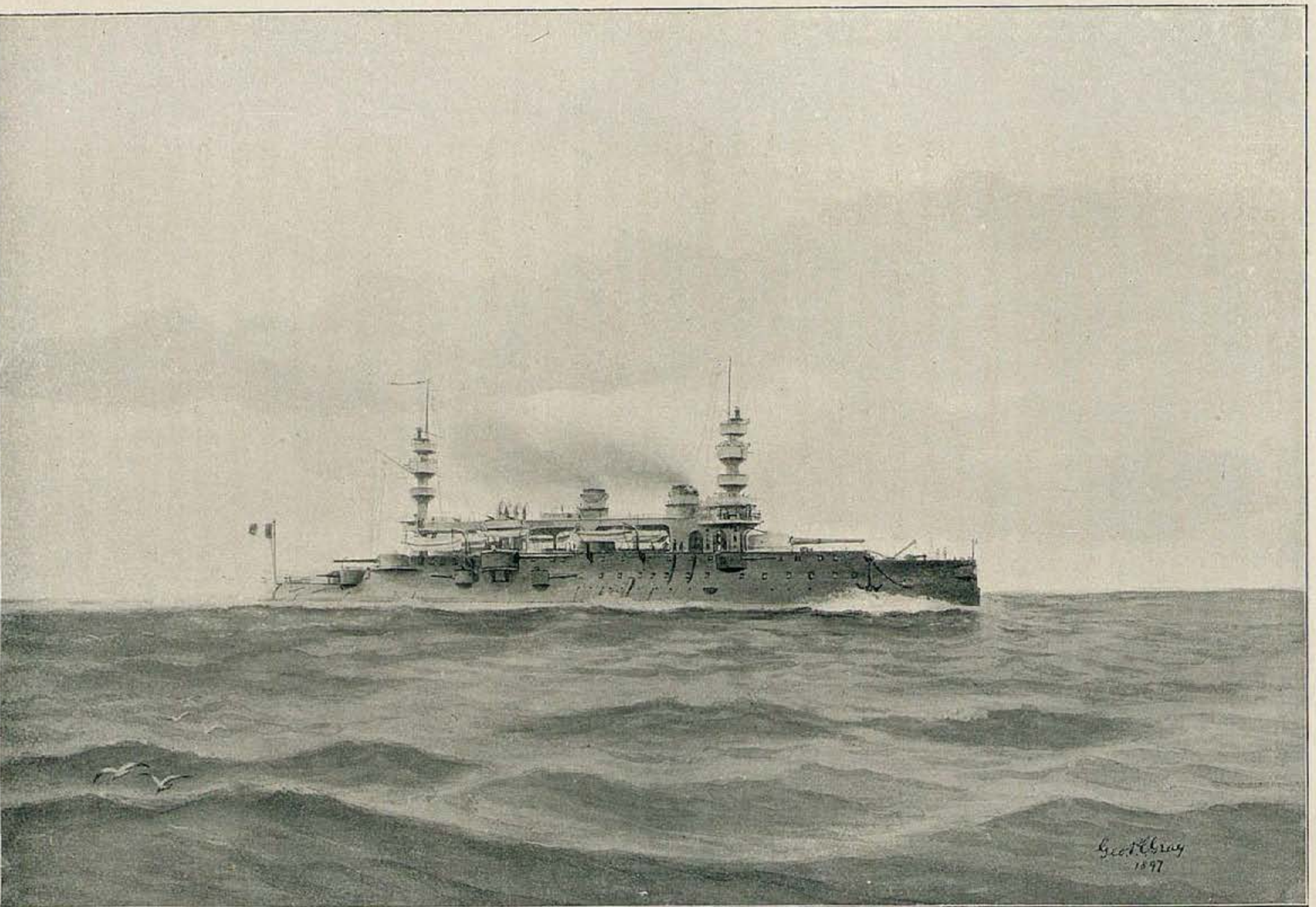
The most important vessels which have made their trials during the year are the Jauréguiberry and Carnot. The Jauréguiberry is a twin-screw battleship of 11,824 tons displacement and 14,200 horse-power, built by the Forges et Chantiers de la Méditerranée, on the designs of M. Lagane. The contract speed was 17·5 knots. The armament comprises two 12-in. and two 10·6-in. guns, mounted in turrets at the four angles of a quadrilateral, on the old French system; eight 5·5-in. Q.-F. guns coupled in four turrets; four 2·5-in. and twelve 1·8-in. Q.F. guns; eight 1·4-in. machine-guns, and six torpedo-tubes, of which two are submerged. Both guns and turrets can be worked by hand or by electricity, the Jauréguiberry being the first large battleship which has been fitted throughout with machinery of this kind. The preliminary trials were uneventful. With 7000 horse-power and a mean of 80 to 82 revolutions, the speed was 16·5 knots. A few days afterwards a second trial took place, which gave complete satisfaction. With a mean draught of 25 ft. 9 in. (viz., forward, 23 ft. 10 in., aft, 27 ft. 8 in.) nine runs were made on the base off Hyères with the following results:—Maximum horse-power, 12,400; maximum speed, 17·65 knots; mean speed, 17·47 knots. Subsequently, with 100 revolutions and 15,800 horse-power, a mean speed of 18·07 knots was obtained. The first official trial took place on May 21st. With natural draught and all the furnaces lighted, the engines developed 13,819 horse-power, the consumption of coal being 1·51 lbs. per I.H.P. per hour. The maximum speed attained was 17·78 knots, and the mean speed 17·66 knots, instead of 17 knots as estimated. As the contract speed with modified forced draught was thus exceeded with natural Steam trials. Jauréguiberry.

* Though of the same dimensions the Durandal is called in the Projet "aviso-torpilleur," the Hallebarde "torpilleur d'escadre."—Ed.

draught, the Ministry of Marine considered it unnecessary to proceed to the full power trials. The other trials provided in the contract at different powers were continued, and finally the regular twenty-four hours' trial at sea with all furnaces lighted was proceeded with. It was at the conclusion of this trial that the fatal boiler accident took place. The vessel was returning to the harbour of Toulon when one of the tubes of the D'Allest boilers was ruptured for eight inches of its length. The boiler immediately emptied itself into the furnace. The steam filled the stokehold, and six men were killed, some on the spot, while others died afterwards from their injuries. The rupture took place at the weld. After a thorough inquiry it was decided that all tubes exposed to the direct action of the flames should be replaced by weldless tubes, which will probably be required for the future in all multitubular boilers.

The Jauréguiberry has very beautiful lines, and in the opinion of all her officers her general arrangement is admirable. The decks are unencumbered, and there are none of those superstructures which have been criticised so much and with such good reason on recent French battleships. The Naval constructor who had charge of her construction was entirely responsible for the designs of the ship; and, once the design had been agreed upon, it was not subjected to alteration. The Jauréguiberry has joined the Mediterranean squadron.

Carnot. The battleship Carnot is about to join the Mediterranean Squadron. Her commissioning has been delayed owing to alterations which are being made as the result of her trials. As she is fitted with D'Allest boilers, the rows of tubes exposed to the direct action of the flames have, in consequence of the accident to the Jauréguiberry, been replaced by weldless tubes. As she was also found to exceed her designed displacement by 100 tons, weight has been reduced as much as possible by taking out the after military mast, and by cutting down the bridges. The Carnot was fully described in the *Naval Annual* of 1895. She is of 12,008 tons displacement. In the distribution of her main armament in four distinct positions she resembles the Hoche, but in her principal characteristics she follows the Brennus. Above the water-line belt, the thickness of which varies from $10\frac{3}{4}$ in. to $17\frac{3}{4}$ in., the side is covered with 4-in. armour, behind which is a coffer-dam. Both the main and auxiliary armaments are mounted singly in turrets. The lower edge of the belt armour is 5 ft. 7 in. below, and the upper edge is 1 ft. 10 in. above, the water-line; the thin armour above it is carried to 3 ft. 9 in. above the water-line. The armoured deck is $2\frac{3}{4}$ in. thick, and is at the middle line amidships 3 ft. 11 in. above the water-line, while at the extremities it is level with the water-line. A splinter-proof deck extends the whole



"CHARLES MARTEL,"

FRENCH BATTLESHIP.

length of the ship below the armoured deck. The Carnot has twin screws, each driven by two vertical triple-expansion engines, to which steam is furnished by twelve D'Allest boilers. The bunkers hold rather over 700 tons of coal. The armament includes two 12-in. and two 10·6-in. guns, eight 5·5-in., four 2·5-in., sixteen 1·8-in., and ten 1·4-in. Q.-F. guns. The 12-in. guns have an arc of fire of 270 degrees, the bow and quarter 5·5-in. guns an arc of 150 degrees, the guns amidships an arc of 180 degrees. The bow gun is 29 ft. 6 in., the other 12-in. gun, the 10·6-in. guns, and the bow and quarter 5·5-in. guns are 21 ft. 3 in., and the remaining 5·5-in. guns 14 ft. 9 in. above the water. They are worked by hydraulic power. Four torpedo-tubes, two being submerged, are fitted. The complement is 615 men, of whom 32 are officers. The Carnot has been criticised for the development of her superstructure. On the other hand she is considered to have great offensive and defensive power. It may be noted that closed turrets for the auxiliary armament have not been employed in recent types. The preliminary trials were satisfactory. With 90 revolutions and 8000 horse-power the Carnot steamed 16 knots in a strong wind. With 102 revolutions and with natural draught the speed was 17·45 knots. The trial with stimulated natural draught gave the following results: I.H.P., 11,547; revolutions, 98·5; speed, 17 knots. With modified forced draught, all furnaces being in use, the engines gave 105 revolutions, the I.H.P. was 16,300, and the mean speed was 17·86 knots.

Charles Martel.

The Charles Martel, whose preliminary trials were satisfactory, steamed 16·8 knots, with 10,990 I.H.P. The designed power with modified forced draught being 13,500, there is every reason to believe that the estimated speed of 17·5 knots will be realised. The Charles Martel having D'Allest boilers, it was decided, after the accident on the Jauréguiberry, to change the lower rows of tubes and to postpone her final trials till this change had been made. Hence her entry on active service was delayed, but she may be considered as ready for sea.*

Tréhouart.

The Tréhouart of 6610 tons displacement is sister ship to the Bouvines. They are distinguished from the Jemmapes and Valmy by their high bow. All of these ships roll very much, and have the further disadvantage of possessing only two guns for their main armament. The Tréhouart was commissioned last year. The following are the results of her trials:—With 6760 I.H.P., 105 revolutions, and burning 2 lbs. of coal per I.H.P. per hour, the speed was 15 knots. On the full power trial with 8350 I.H.P., 112

* Has been commissioned in consequence of troubles in Cretan waters.—Ed., 10th March.

revolutions, and burning 2·47 lbs. per I.H.P. per hour, the speed attained was 15·76 knots, or less than that of the Bouvines. During the 24 hours' trial with 5220 horse-power, 96 revolutions, and burning 1·6 lbs. per I.H.P. per hour, the mean speed was 14 knots. This type of small battleship, which appears to have been built in answer to the German third-class battleships Siegfried, Frithjof, etc., will not be repeated.

Bruix. The Bruix is the last to be completed of the armoured cruiser class, to which belong the Latouche-Tréville, Charner, and Chanzy. Displacement 4754 tons. The boilers are of the Belleville type, and the two engines were estimated to develop 8500 horse-power. During the full power trial the machinery developed 9049 horse-power, the corresponding speed being 18·3 knots, a very similar result to those recorded for the other ships of this class, which will not be reproduced in the French Navy. They are smaller and consequently cheaper than the Dupuy de Lôme. Though they have shown good sea-keeping qualities, the coal-carrying capacity is insufficient for a cruiser, and they will be employed in the squadrons in European waters. In the Jeanne d'Arc the French Navy has at one step greatly exceeded the displacement of all her armoured cruisers at present afloat.

Pothuau. The armoured cruiser Pothuau, of 5360 tons displacement, attained a speed of 19·2 knots on her trials with 10,378 I.H.P. The coal consumption was 1·85 lbs. per I.H.P. per hour. The estimated speed was 19 knots with 10,000 horse-power.

Descartes. The Descartes is a second-class protected cruiser sheathed with wood for service on foreign stations. She has just left for China. The displacement is 3938 tons, and in this and other respects she resembles the Pascal described last year. The official consumption trial gave the following results:—I.H.P., 3826; coal consumption, 1·32 lbs. per I.H.P. per hour; speed, 16 knots. With natural draught, all the furnaces being lighted, I.H.P. 6280 and 123 revolutions, the speed was 18·2 knots. The consumption of coal was 1·74 lbs. per I.H.P. per hour. The full power trial with modified forced draught was specially remarkable. Nearly 9000 horse-power was developed, and with 136 revolutions the ship steamed 20·5 knots, or nearly two knots in excess of the estimate. The consumption of coal was 1·81 lbs. per I.H.P. per hour. When the Descartes with all stores on board came to make her stability trials the coefficient of stability was found to be insufficient, and in her then condition the ship was not fit to go to sea. In order to improve the protection of the guns, and for other reasons, top-weight had been added in the course of construction. Fortunately the weight of the hull was less

than the designed weight; and without overloading the ship, and even with something to spare, it was found possible to remedy the defect in stability by an addition of about 75 tons of cement ballast in the double bottom. Some further small alterations were made, and the stability of the Descartes is now quite satisfactory.

The second-class cruiser Bugeaud has been commissioned in the Mediterranean Squadron. Her displacement is 3740 tons, and she is only protected by an armoured deck. She has two vertical triple-expansion engines and Belleville boilers. Her radius of action at 10 knots is 5500 miles. The following are the results of her trials:—With 3500 horse-power she only consumed 1·34 lbs. of coal per I.H.P. per hour, instead of 1·54 lbs. allowed by the contract. On the natural draught trial, all furnaces lighted, the engines developed 7471 horse-power instead of 7000 as estimated. The consumption of coal was 1·66 lbs. per I.H.P. per hour, and the speed 17·7 knots. On the full power trial the speed was 19 knots with 9965 horse-power, burning 2·03 lbs. per I.H.P. per hour. The Bugeaud is a sister ship to the Chasseloup-Laubat and the Friant; the former of which has D'Allest boilers and the latter Niclausse boilers. A valuable comparison may thus be made of the efficiency of the three types. The Belleville and D'Allest boilers are already well known, being fitted in a number of French ships. The Niclausse boilers appear for the first time in the Friant. That they have given satisfaction may be inferred from the fact that they have been adopted for the new battleship Henri IV., and for the coast-defence ship Requin and the cruiser Davout, which are being refitted. **Bugeaud.**

The cruiser Pascal, sister ship to the Descartes, may be considered as available for service, her principal trials being completed. The 3 hours' consumption trial gave the following results:—I.H.P., 7232; consumption of coal per I.H.P. per hour, 1·84 lbs.; speed, 18·5 knots. The so-called 10-knot trial is worth noting: I.H.P., 935; revolutions, 76·27; coal consumption, 1·21 lbs. per I.H.P. per hour; mean speed, 10·5 knots. **Pascal.**

The torpedo depôt ship Foudre, built by the Chantiers de la Gironde, has exceeded her estimated speed. On the modified forced draught trial, with 107 revolutions, 11,930 horse-power were developed, instead of 11,500 horse-power estimated, and the speed was 19·58 instead of 19 knots. The question of altering this ship into an ordinary cruiser has been discussed, but the intention has been abandoned. On account of the difficulty of putting the torpedo-boats into the water, the whole of the boats which the Foudre was designed to carry have not yet been ordered. As, however, the ship possesses an excellent workshop, she is in a position to render great **Foudre.**

service to a squadron by giving it the means of repairing its torpedo-boats and all small defects in machinery.

Fleurus. The torpedo-cruiser Fleurus (displacement, 1310 tons) has horizontal triple-expansion engines and cylindrical boilers of the so-called English Admiralty pattern. Her boilers were refused after the trials last year. In January of the present year her trials were resumed, but leaks in the upper plates of the boilers compelled them to be abandoned. The Fleurus should resume her trials in March.

Refits. Several ships are undergoing important refits. In the case of the Formidable the 13·5-in. gun amidships is being replaced by four 6·3-in. Q.-F. guns, mounted in an unarmoured battery. The four coast-defence or second-class battleships Requin, Terrible, Indomptable, and Caiman are to be very materially altered. Work has been commenced on board the Requin.

Two torpedo-boats, one sea-going, the other first-class, sank after collision. The first, the Audacieux, was run into during the night in the Bay of Ajaccio while she was manœuvring, without lights, in company with a section of the Reserve Squadron. The other, No. 83, sank in a few minutes near the Bay of Douarnenez while executing some manœuvres.

Germany.

The Emperor William wishes to have a powerful Navy, and the efforts of his Government are directed to this object. The commerce of the German Empire is increasing all over the world with a rapidity which causes her competitors some anxiety. German colonists are making their way everywhere, and, owing to their excellent qualities, are ousting their rivals. The Mercantile Marine is rapidly increasing, and if there is still no comparison between it and that of Great Britain, it has taken the first place amongst the Merchant Navies of the Continent. The Canal from the Baltic to the North Sea, from a commercial point of view, has not fulfilled the hopes of its promoters, but has quite done so from a military point of view. Last year, during the Naval manœuvres, the whole German Fleet passed through it in thirty hours. The Canal thus doubles the efficiency of the Imperial Navy by allowing it to concentrate rapidly either in the Baltic or in the North Sea—an immense strategical advantage. Nevertheless, the strength of her Naval position appears insufficient to satisfy the views at present held by the Empire, and the Imperial Government is asking the Reichstag for an important increase to the Navy Estimates.

Estimates. The Navy Estimates for the year 1897–98 amount—including extraordinary expenditure—to a total of £6,467,977—the highest

sum yet reached since the inauguration of the rapid Naval expansion by the Emperor William II. From 1874 to 1889–90 the Navy Estimates increased gradually from about £1,950,000 to about £2,750,000. Upon the accession of the present Emperor, General von Caprivi, who some years previously had been appointed Minister of Marine, gave way to a Minister more in harmony with the ideas of the young sovereign. As a result, in the first budget of the present reign—that of 1890–91—the Naval Estimates suddenly increased to nearly £3,600,000. In the following year they amounted to more than £4,750,000, and in 1892–93 to more than £4,500,000. For the last three years they have averaged about £4,150,000.

Early in March (that is, after this chapter was in print) the Secretary of State for the Imperial Navy, Admiral Hollman, electrified the Budget Committee by laying before them a memorandum intimating that for the years 1898–1901 an expenditure on new construction is proposed of £9,144,000, in addition to the sums provided in the Navy Estimates for 1897–98 for vessels already in hand to be laid down during the present year. Admiral Hollman's proposals include the construction of four first-class battleships, six first-class cruisers, besides numerous smaller vessels, principally torpedo-boats and torpedo-division boats.

New programme.

In the Estimates for 1897–98 it is proposed to lay down one first-class battleship, two second-class cruisers, one despatch-boat, two gunboats, one torpedo-division boat, and eight torpedo-boats. The first instalments for all these vessels amount to about £300,000. The new battleship is to take the place of the König Wilhelm, which is twenty-nine years old; the two cruisers O and P will be modified Gefions; the despatch-boat is to take the place of the Falke, the two gunboats will replace the Hyane and the Iltis (lost in the China Seas on July 29th, 1896). The new battleship is to cost £756,000, and the cruisers £400,000 each.*

Besides these proposed important additions to the German Fleet, we must allude to the shipbuilding work now going forward. A few new vessels—including the coast-defence ship Odin (3600 tons)—remain under trial. The only vessel launched during the past year has been the battleship Kaiser Freidrich III. (Ersatz-Preussen) at Wilhemshaven. The other vessels in hand are the first-class armoured cruiser Ersatz-Leipzig (10,650 tons) at Kiel; the second-class cruisers Ersatz-Freya at Danzig; K, L, M, at Danzig; and N at Stettin; the fourth-class cruiser G, a torpedo-division-boat or destroyer, at Chiswick; and eight torpedo-boats.

* *Cf.* German Navy Estimates, Part IV. The votes for the two cruisers have been refused.—Ed.

Cruisers. The Ersatz-Leipzig, Ersatz-Freya, K, L, M, and N have three propellers. The Ersatz-Freya has Niclausse, K. Belleville, and L. Durr boilers, which are a copy of the Niclausse boilers. The German Navy has adopted so-called Q.-F. guns of 9·4-in. as well as 8·2-in. calibre,* besides a new 5·9-in. gun. Though Messrs. Armstrong of Elswick have already mounted 8-in. Q.-F. guns in more than one cruiser, until quite lately, the most powerful quick-firing piece was a 6·3-in. gun. The Ersatz-Leipzig will carry four 9·4-in. guns and twelve 5·9-in. Q.-F. guns. The five second-class cruisers will each carry two 8·2-in. Q.-F. guns.

Kaiser Friedrich III. The Kaiser Friedrich III., hitherto known as the Ersatz-Preussen, was launched on 1st July at Wilhemshaven. Her length over all is 410 ft.; length between perpendiculars, 377 ft. 4 in.; beam, 67 ft.; draught of water aft, 25 ft. 8 in.; displacement, 11,000 tons. The hull is protected by a Harveyed steel belt 6 to 12 in. in thickness, which extends for four-fifths of the length from the bow. At its after end there is a transverse armoured bulkhead. There is an armoured deck 2½ to 3 in. in thickness and a splinter-proof deck. The armament has been modified on account of the adoption of the Q.-F. guns before mentioned. It includes four 9·4-in. so-called Q.-F. guns coupled in turrets protected by ten inches of hardened steel; six 5·9-in. Q.-F. guns in turrets protected by 6-in. hardened steel; twelve of the same calibre in casemates protected by 6-in. armour in front and 4-in. screens; twelve 3·5-in. guns behind shields; twelve 1·4-in. revolver guns, and eight machine guns. There will be six torpedo-tubes. The three vertical triple-expansion engines should develop 13,000 horse-power; estimated speed, 18 knots. The boilers will be of two types: tubular boilers, which will furnish two-thirds of the power and will be used for ordinary service; multitubular boilers, which will furnish the other third of the power, and will be used conjointly with the others for full speed. The normal coal supply is 750 tons, but by the use of liquid fuel the radius of action will be increased. The Ersatz Friedrich der Grosse, which was laid down last year, is sister ship to the Kaiser Friedrich III.

Steam trials. Geier. The third-class cruiser Geier, laid down on 2nd November, 1893, at Wilhemshaven, and launched 18th October, 1894, completed her trials early last year. Displacement, 1640 tons; length, 246 ft.; beam, 33 ft. 6 in.; draught of water, 15 ft. She differs from the older ships of the class—Kondor, Kormoran, etc.—as she is sheathed with wood and coppered. Moreover, the half turrets of the 4-in. guns have been eliminated. The armament comprises eight 4-in. and five 1·4-in. Q.-F. guns, eight machine guns, and two torpedo-

* *Cf.* note, p. 17.

tubes. The ship is rigged as a three-masted schooner. The two engines are estimated to develop 2800 I.H.P., and to give a speed of 16·5 knots. On the six hours' forced draught trial 2884 horse-power was developed, and the speed was 16·29 knots. The consumption of coal was 1·99 lbs. per I.H.P. per hour. According to the results of the various trials, the radius of action of the Geier is 2637 miles at 15 knots and 4362 miles at 10·5 knots. Aluminium has been used in the construction of scuttle-lids, voice-pipes, ventilators, etc. Though it is not now possible to give a definite opinion, it appears that aluminium can only be utilised in parts of a ship which can be easily got at for painting, and where it is not exposed to any bending strain.

The torpedo-gunboat Komet of 946 tons displacement has completed her trials. She was launched in 1892, has been commissioned on four different occasions since 1893, and each time she has had to return to the dockyard for alterations to her machinery. On her full power commissioning trial she steamed 21 knots. Komet.

The cruiser Hela of 2000 tons, 6000 horse-power, and 21 knots speed, has been commissioned for her trials. Hela.

Italy.

By a law passed in 1887, £1,000,000 exclusive of supplementary votes was to be spent annually on carrying out a programme for the reconstruction of the Fleet, and this programme was to be completed by January, 1898. Owing to the financial situation, the Navy Estimates have dropped from £4,960,000 in 1891 to £3,796,845* for 1897-8. The vote for new construction has been reduced to £800,000, and no supplementary credits have been voted. All hope of carrying out the programme of 1887 must be abandoned, as the Fleet will fall short of the strength proposed by no fewer than eighty-nine vessels. The Italian Government last year authorised the firm of Ansaldo to hand over to Spain and the Argentine Republic three armoured cruisers of the Garibaldi type which were building for Italy, and consequently the number of powerful ships which would have been shortly available has been reduced. The Minister of Marine, in the introduction to the Navy Estimates for the coming year, speaks very strongly on the Naval position of Italy. He has drawn up a new programme which would entail an annual expenditure of £1,040,000 for new construction. There are rumours that it is proposed to lay down three 13,000-ton battleships, one armoured cruiser, and several

* See Part IV.

torpedo-boat destroyers. The lists of officers have been fixed as follows:—One admiral, seven vice-admirals, thirteen rear-admirals, fifty-three post-captains, seventy captains of frigates, seventy captains of corvettes, 340 lieutenants, 167 sub-lieutenants, and 120 midshipmen.

The first Giuseppe Garibaldi, referred to above, was sold to the Argentine Government and re-named Garibaldi; the second Giuseppe Garibaldi was sold to Spain and re-named Cristobal Colon; the third is building for the Italian Government. The first Varese was sold to the Argentine Government and re-named the San Martino; the second is building for Italy.

The launch of the armoured cruiser Carlo Alberto, sister ship to the Vettor Pisani, took place after long delays at Spezia on 23rd September. Her dimensions are:—Length, 325 ft.; beam, 59 ft.; draught, 22 ft. 11 in.; displacement, 6500 tons; speed 20 knots. These ships are fully described on p. 35 of the *Naval Annual*, 1896.

A torpedo-boat of 135 tons displacement, 2500 horse-power, and 25-knot speed, has been ordered from the Odero yard.

In conclusion, the year 1896 has not seen any important ship laid down for the Italian Navy. Expenditure has been concentrated on ships already in course of construction, on the refit of several battleships of somewhat old type, and on the maintenance of the Fleet. A large store of petroleum is being accumulated for use on her men-of-war. For some years past the employment of liquid fuel has been the subject of careful study in Italy, and a good solution of the problem has been found. In this respect Italy is in advance of most Naval Powers.

The old ironclad Roma was set on fire by lightning in Spezia Harbour. To save other ships in the neighbourhood two torpedoes were fired into her, which sank her.

Russia.

The Russian Navy Estimates for 1897 have risen to £6,239,809, as compared with £6,038,125 * for 1896. In spite of this increase the vote for new construction has been reduced from £2,033,353 to £1,679,568. On the other hand, the expenditure for ships in commission exhibits an increase which affects several votes. The *personnel* includes 29,850 seamen, 1372 officers, 336 engineers, and 476 midshipmen. Since the Chino-Japanese War a powerful squadron has been maintained in the waters of Eastern Asia. The squadron in the Mediterranean has been much increased since last year. The works at the port of Libau are making rapid progress, and a port accessible

* *Cf.* Estimates, Part IV. Rouble converted at £1 = 9·6 roubles.—Ed.

throughout the winter will soon be available for the Russian Fleet. Vladivostock, the dockyard in Eastern Siberia, possesses powerful ice-breakers, which kept a channel open for ships throughout the year. During the winter of 1895–96, the ice was broken for a distance of four miles, and the blocks were occasionally 12 ft. thick. The Volunteer Fleet, which maintains the service between the Black Sea and Vladivostock, receives close attention from the Government, and is being increased every year.

The cruiser Rossia was launched on 12th May, 1896. She is the longest vessel ever launched on the Neva, and the largest Russian ship of this kind afloat. The Rossia is 464 ft. between perpendiculars. Including the ram, the full length is over 480 ft.; her greatest breadth over all is 68 ft. 6 in.; mean draught, 26 ft.; displacement, 12,195 tons. Her coal-carrying capacity is 2500 tons. Her triple-expansion engines, manufactured at the Baltic Works, are of 18,000 I.H.P., and the expected speed is 19 knots. She is fitted with three propellers. The boilers, thirty-two in number, are of the Belleville type, made in France. The armoured belt is 10 in. in thickness, extending over four-fifths of the length at the water-line. The ends of the belt are united by two transverse bulkheads of 9-in. armour. The armoured deck is 2·8 in. in thickness. The armour-plates for the belt have been made at the Carnegie Mills in America. The Rossia has a double bottom and 149 watertight compartments. The armament consists of four 8-in. guns, sixteen 6-in., seventeen 3-in., 1·8-in., and 1·4-in. Q.-F. guns, besides six torpedo-tubes. The Rossia grounded in the Neva as soon as she was launched. She was floated off and rapidly completed for sea, but in November ran aground again on a shoal in Cronstadt Roads. After some days' hard work she was floated off without any material damage and docked at Cronstadt. Ships launched. Rossia.

The General-Admiral Apraxin was launched on 12th May, 1896. She is a sister ship of the Admiral Oushakoff and Admiral Seniavin, described last year. They belong to a class which was specially designed for coast defence, but which can also be utilised for foreign service. Displacement, 4126 tons; speed, 16 knots. Apraxin.

The battleship Rostilav, of the Sissoi Veliky type, was launched on 2nd September, at Nicolaieff. Length, 341 ft.; beam, 66 ft. 6 in.; mean draught, 24 ft.; displacement, 8880 tons. Triple-expansion engines of 8500 horse-power, driving two screws, are to give a speed of 16 knots. Protection is afforded by an armoured belt of a maximum thickness of 15¾ in., with a mean depth of 7½ ft. This belt extends for four-fifths of the length, and tapers gradually to a thickness of 12 in. at the extremities. Above the armour belt the Rostilav.

ship's side will be protected by 5-in. steel armour from turret to turret, with armoured transverse bulkheads of the same thickness, forming a central redoubt. An armoured deck of 2 to 3-in. plates extends the whole length of the ship. The armament consists of four 10-in. guns, mounted in two turrets, one forward, one aft, protected by 12 to 10-in. plates, eight 5·9-in. Q.-F. (Canet) guns in the central redoubt, twelve 1·8-in. and four 1·5-in. Q.-F. guns. The sixteen boilers are of the cylindrical pattern, and will be fitted for the use of petroleum.

Svietlana. The cruiser Svietlana, built at Havre by the Forges et Chantiers de la Méditerranée, was launched in December, 1896. This vessel is of 3828 tons displacement, and has an estimated speed of 20 knots. She was fully described last year.

The gunboat Gilyak has also been launched. Displacement, 960 tons; horse-power, 1000; speed, 12 knots.

Steam trials. Georgi Pobiedonosetz. The first-class battleship Georgi Pobiedonosetz, has completed her trials at Sevastopol. Displacement, 10,280 tons; length, 320 ft.; beam, 69 ft.; mean draught, 26 ft. 6 in. The armament consists of six 12-in. guns, carried in three barbettes placed as in the Sinope class (*cf.* plate 81). Each barbette carries two guns. There are also seven 6-in. guns, eight 3·9-in. Q.-F. Canet guns and six machine guns. The vital portions of the ship are protected by a belt of 16-in. and the barbettes by 12-in. compound armour. The propelling machinery is of the vertical inverted triple-expansion type, and was manufactured by Messrs. Maudslay, Sons and Field. Working steam pressure, 150 lb. per square inch. Steam is supplied by sixteen boilers, arranged in four separate compartments. They are of the cylindrical single-ended type. The stipulated power was 10,600, to be maintained for six hours with assisted draught, 1½ in. air pressure in the stokeholds being the maximum allowed. The trial took place on 21st May. The results were as follows:—Mean revolutions, 90; mean I.H.P., 13,468; speed, 15 knots. The mean air pressure in the stokehold was ·25 of an inch. At the time of the trial she had been in the water twelve months without docking. If the ship's bottom had been cleaned the speed would probably have been 15½ knots. The result was considered highly satisfactory, the above-mentioned horse-power, nearly 3000 in excess of the contract, being maintained with ease by the ordinary ship's crew of Russian stokers and artificers, led by a small staff of Englishmen. The Georgi Pobiedonosetz has joined the battleships Sinope, Catherine II., Tchesmé and Dvenadsat Apostoloff, forming a squadron of five fine first-class battleships for the Black Sea Fleet.

The battleship Tri Sviatetelia (Three Saints), launched at Nicolaieff in October, 1894, differs from the other Black Sea ironclads in the distribution of her armament. It comprises four 12-in. guns, coupled in two turrets, forward and aft respectively; eight 5·9-in. guns in an armoured redoubt; four 4·7-in. Q.-F. guns, besides smaller pieces. The trials were carried out under the direction of Mr. Robert Humphrys, of Messrs. Humphrys, Tennant and Co., the manufacturers of the machinery. At the request of the Naval authorities the I.H.P. was kept down to 11,400, which was maintained easily for twelve hours, giving an average speed of 17¾ knots with open stokeholds. The contract power was 10,600. Three Saints.

The coast-defence ship Admiral Senjavin, whose engines are also by Messrs. Humphrys, Tennant and Co., attained an average speed of 16 knots on a twelve hours' run.

The Imperial yacht Standard, which brought the Czar and Czarina from Copenhagen to Leith last year, has finished her trials. She and the Hohenzollern, the German Emperor's yacht, are the finest ships of this class. The former is armed with eight 1·8-in. Q.-F. guns, and can be used as a cruiser. On her trials she steamed 21·8 knots, being more than the estimated speed. The Standard has Belleville boilers, and was built at Copenhagen. Standard.

The following ships have been laid down:—One battleship of the Rostilav type mentioned above; a coast-defence ship of the General-Admiral Apraxin type, which was fully described last year; two cruisers, the Pallada and Diana, at the Galierny Ostrov, on the Neva, and the torpedo-boat destroyer Bakan. An enlarged armoured cruiser of the Rossia type of about 14,000 tons displacement, is to be laid down at the Baltic yard. The main armament of the new Rossia will include four 9·8-in. and eight 5·9-in. Q.-F. guns.* The Pallada and Diana are protected cruisers. Length, 413 ft. 4 in.; beam, 55 ft. 9 in.; displacement, 6630 tons; horse-power, 12,500; speed, 20 knots. They will have three screws. The armoured deck is 2·4 in. thick. The armament comprises six 5·9 in., six 4·7 in., twenty-seven 1·8 in. and 1·4 in. Q.-F. guns. The Bakan, which has already been launched, displaces 240 tons. Length, 180 ft. 6 in.; beam, 15 ft. 7 in.; draught of water, 11 ft. 6 in.; I.H.P., 3800. Ships laid down. Pallada and Diana.

The Volunteer Fleet, a list of which is given in Part II., is continually being increased. All the ships are built in England. Their armament is kept in the Government magazines at the termini of their route, Odessa and Vladivostock. The most recent have an armament of three 4·7 Q.-F. guns and twenty smaller pieces. Two new twin-screw ships similar to the Kherson, the most recently Volunteer Fleet.

* Particulars doubtful.—Ed.

completed of this fleet, are being built in England. They will be named the Moskva and Poltava, and will be armed with 6-in. guns. An order has been given for an additional steamer, an improved Kherson. During the tea season the ships of the Volunteer Fleet ascend the Yang-tse-kiang as far as Hankow. They carried 35,000 tons of tea to Odessa in 1896.

Austria-Hungary.

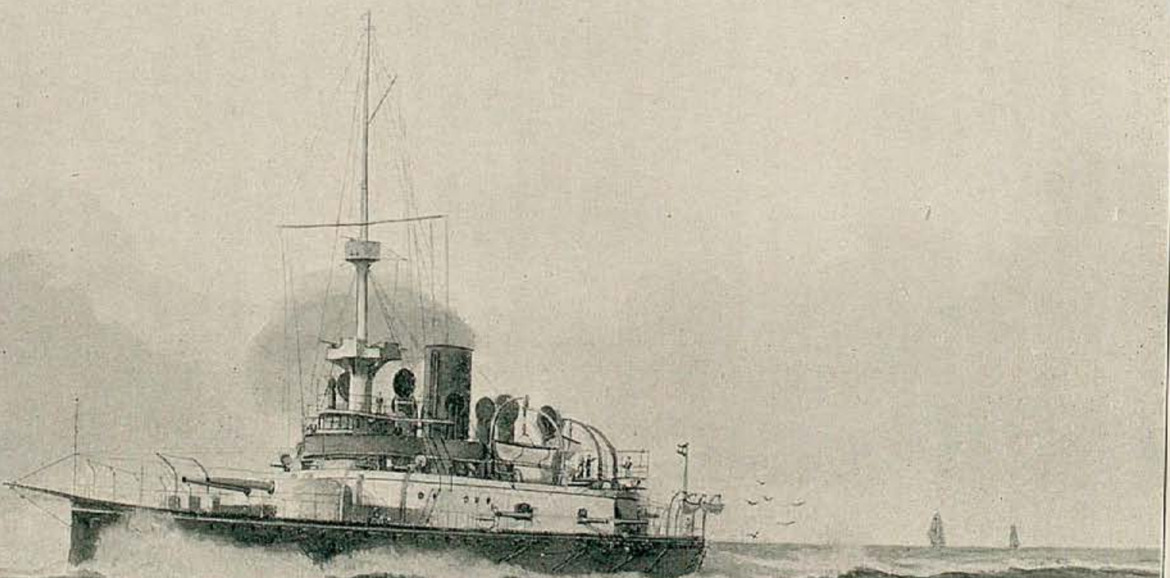
The Budget of 1897 includes £1,038,106 of ordinary expenditure and £360,020 of extraordinary expenditure, being an increase on the estimates for 1896 of £50,000. The shipbuilding programme includes the laying down of the torpedo cruiser B, intended to replace the Helgoland. She will be a sister ship to the torpedo cruiser A, which is already on the stocks, and is to replace the Greif. The displacement of these vessels is 2300 tons; horse-power, 7800; and speed, 20 knots. Their dimensions are: Length, 301 ft. 10 in.; beam, 39 ft. 4 in.; mean draught, 14 ft. 2 in. In 1896 the ram cruiser D, of the Kaiserin und Königin Maria Theresa type modified, was laid down. Displacement, 6100 tons; horse-power, 12,000; speed, 20 knots. We mentioned this ship in the *Naval Annual* for last year.

Wien. The coast-defence ship Wien, sister ship to the Monarch and Buda Pesth, which are completing afloat, has been through her trials. Displacement, 5550 tons; horse-power, 8500. She steamed 17·6 knots.

Magnet. The torpedo-gunboat Magnet, built by Schichau at Elbing, has also been through her trials. Length, 221 ft. 6 in.; beam, 27 ft.; draught of water, 10 ft. 10 in.; displacement, 510 tons; horse-power, 6000. The estimated speed was 24 knots, but on her trials she attained a speed of 26 knots. Armament, six 1·8-in. Q.-F. guns and three torpedo-tubes. The sea-going torpedo-boats Matter and Viper, the first of 152 tons and 2300 horse-power; the second of 106 tons and 1940 horse-power, have also made their trials. The former attained a speed of 26·5 knots, the latter 26·6 knots.

Denmark.

The small battleship Skjold has been launched at Copenhagen. Length between perpendiculars, 220 ft. 8 in.; length over all, 242 ft. 9 in.; beam, 37 ft.; draught of water aft, 17 ft. 5 in.; displacement, 2160 tons; horse-power, 2200; estimated speed, 13 knots. Protection is provided by a steel belt at the water-line, the thickness of which varies from 6¼ to 9 in., and a 2-in. armoured deck extending



"BUDA-PESTH,"

AUSTRIAN COAST-DEFENCE SHIP.

from end to end. The armament includes one 9·4-in. gun in a turret protected by 8 in. of steel, three 4·7 Q.-F. guns in turrets protected with 4·3 in. of steel, four 1·8-in. Q.-F. guns, and two machine guns.

A battleship of 5000 tons displacement, the Herluf Tralle, has been laid down. A coast-defence ship of the Lindormen type (2080 tons) and several torpedo-boats are projected. The battleship Helgoland, of 5370 tons displacement and 13 knots speed, has been refitted.

Greece.

The battleships of the Psara type are to be refitted at La Seyne, and to receive an armament of Q.-F. guns. The refit of these vessels has been suspended in consequence of the Cretan troubles.

Holland.

The Dutch Government has published a programme of shipbuilding for the Navy. It includes:—

Twelve protected cruisers of the same type as the Holland, Friesland and Zeeland—3900 tons, 9250 I.H.P., 20 knots—except that the armour shields for the 5·9-in. and 4·7-in. guns will be 6 in. thick.

Six armoured vessels resembling the Kortenaer, Evertsen and Piet Hein, which are of 3400 tons displacement, 4500 horse-power, and 16 knots speed, are also proposed. Some modifications are to be made in the armament. Instead of three guns of 8·2 in., there will be two 9·4-in. guns, each in a barbette. The two 5·9-in. Q.-F. guns will be replaced by four 4·7-in. Q.-F. protected by 2-in. steel shields. The displacement will be 3936 tons; and the engines of 5300 horse-power. Speed, 16 knots.

Three monitors, type A, for coast defence. Displacement, 1500 tons; length, 187 ft.; beam, 43 ft. 4 in.; draught, 10 ft. 4 in. There is to be a protective deck 2 in. thick, and a belt of 8-in. armour. Armament: two 8·2-in. guns in two barbettes, four 2·9-in. quick-firers protected by shields, and four 1·4-in. quick-firers. The engines are of 700 I.H.P.; speed, 9½ knots.

Three monitors, type B. Displacement, 1406 tons; length, 187 ft.; beam, 43 ft. 4 in.; draught, 9 ft. 8 in. The protection is the same as for type A. The armament includes only one 8·2-in. gun in a barbette forward, one 4·7-in. Q.-F. gun, four 2·9-in. and four 1.4-in. Q.-F. guns. Speed, 9½ knots.

Fifteen gunboats. Displacement, 475 tons; protective deck 1 in. in thickness; armament, four 2·9-in. and four 1·4-in. Q.-F. guns. Engines of 550 I.H.P.; speed, 11¾ knots.

Fifteen torpedo-boats of the Forban type. Displacement, 130 tons; armament, two 1·4-in. Q.-F. guns, and two torpedo-tubes; speed, 30 knots.

Six second-class torpedo-boats. Displacement, 50 tons; two torpedo-tubes; speed, 23 knots.

Ten third-class torpedo-boats. Displacement, 37 tons; speed, 20 knots.

The coast-defence ship Piet Hein, 3400 tons, built at Rotterdam, has made her trials. With 4800 horse-power she steamed 16·2 knots instead of 16 knots as estimated. The main armament of this type includes three 8·2-in. and two 5·9-in. guns. The Evertsen and Kortenaer should be completed during the present year.

Nias. The gunboat Nias, intended for the Indian Fleet, steamed 13 knots with 1230 horse-power. She is a vessel of 810 tons displacement, and is armed with three 4·7-in. and two 1·4-in. Q.-F. guns. Her sister ship the Mataram, built by the Colonial Marine, has been launched.

The Estimates for 1897 amount to £1,308,920. Of this sum £628,000 are to be allotted to new construction, armaments, &c.

Norway.

Messrs. Armstrong, Mitchell and Co. have in hand for the Norwegian Navy two armour-clads, designed by Mr. Watts. The first, named the Harald Haarfagre, was launched on 4th January, 1897. The principal dimensions are:—Length, 280 ft.; beam, 48 ft. 6 in.; mean draught, 16 ft. 6 in.; displacement, 3500 tons. Triple-expansion engines of 3700 horse-power, driving two screws, are to give a speed of 16 knots. Armament:—Two 8-in. Q.-F. guns, mounted singly in gun-houses, 8 in. thick in front, six 4·7-in., six 12-pdr. and six 1½-pdr. Q.-F. guns, with two torpedo-tubes. The Harald Haarfagre has an armour belt varying from 7 in. to 4 in. in thickness, a protective deck and a conning-tower protected with 6-in. armour.

Messrs. Schichau, of Elbing, have in hand three 23-knot torpedo-boats of 83 tons displacement. They will be armed with two 1·4-in. Q.-F. guns, and will be fitted with Thornycroft boilers. Speed, 23 knots. The torpedo-gunboat Valkyrien, of 380 tons displacement; length, 190 ft. 3 in.; beam, 24 ft. 4 in.; draught, 9 ft. 2 in., has been completed and delivered. With 3300 horse-power, a speed of 23·2

knots was easily obtained. She is fitted with Thornycroft boilers, and with an armament of two 2·7-in. Q.-F. guns, two machine guns, and two torpedo-tubes.

Portugal.

Two third-class cruisers have been ordered at the Forges at Chantiers de la Méditerranée. Length between perpendiculars, 246 ft.; beam, 35 ft. 6 in.; mean draught of water, 14 ft. 3 in.; displacement, 1800 tons. These ships are to be sheathed with wood and coppered. Two vertical triple-expansion engines are to develop 2650 horse-power. Steam will be furnished by Normand-Sigaudy boilers. Speed, with natural draught, 15 knots; with full power, from 17·5 to 18 knots. Radius of action, 5000 miles at 12 knots. There will be an armoured conning-tower. The armament comprises two Canet 5·9-in. Q.-F. guns, mounted one on the forecastle, one on the poop; four 4·7-in. Q.-F. guns on sponsons; and eight 1·8-in. Q.-F. guns, two machine guns, and two torpedo-tubes. Protection will be given by a 1½-in. steel deck.

A protected cruiser, of 4100 tons and 14,500 horse-power, is building at Elswick. The armoured deck is 4½-in. in thickness on the slopes. She will be armed with four 6-in. and eight 4·7-in. Armstrong Q.-F. guns of 45 calibres, twelve 3-pdrs., six 1-pdrs. and four Maxim guns. There are five torpedo-tubes, three being submerged. The boilers are of the Yarrow type, and the engines by Hawthorne, Leslie and Co. Speed, 22 knots. Coal to be carried on trial, 700 tons. She was ordered on 28th November, 1896, and is to be ready by May, 1898. Her name is probably to be the Dom Carlos I.

A cruiser named the Rainha d'Amelia is building at Lisbon. Displacement, 1660 tons; I.H.P., 4500; speed, 17·5 knots. The armament includes four 5·9-in. and four 3·9-in. Q.-F. guns.

The cruiser Adamastor has been launched at Leghorn.

Spain.

The Spanish Navy has made great efforts to meet the demands made upon it by the rebellions in Cuba and in the Philippine Islands. Owing to the possibility of the intervention of the United States in Cuba, every available ship was put in commission, and the work on new construction and refits was pressed forward. Though an important Colonial Power, Spain is only now beginning to understand the great error which she has made in not paying sufficient attention to her Navy. The various ships under construction are as follows:—

The armoured cruiser Cardinal Cisneros, of 7000 tons, 15,000 horse-power, and 20 knots speed, is building at Ferrol. The Princessa d'Asturias is said to have been injured when launched in October at Carraca, and the Cataluna is on the stocks at Carthagena. The Almirante Oquendo, though launched in 1891, has only just completed her trials. On her natural draught trials she steamed 18·4 knots with 9000 horse-power and 105 revolutions, and on her forced draught trials 20·3 knots, with 13,000 horse-power and 117 revolutions. These four vessels are sister ships to the Infanta Maria Theresa.

The armoured cruiser (or battleship she ought almost to be called) Carlos V., of 9000 tons, 18,500 horse-power, and 20 knots speed, is completing at Carraca. It is hoped that she will be ready for sea during the coming summer.

The protected cruiser Lepanto, 4826 tons, 12,000 horse-power, and 20 knots speed, is getting ready for her trials, which are to take place in the early spring.

The torpedo-gunboat Donna Maria de Molina, of 823 tons displacement, 4600 horse-power, and 19 knots speed, was launched in October at Ferrol. Length, 235 ft.; beam, 27 ft.; draught of water aft, 8 ft. 9 in. The armament will consist of two 4·7-in., two 1·5-in. Q.-F. guns, two machine guns, and four torpedo-tubes. Her sister ships, the Don Alonso de Bazan and Marques de la Victoria, are on the stocks in the same yard.

Two torpedo-boat destroyers built by Messrs. Thomson of Glasgow attained a speed of over 28 knots. The Furor and Terror, as they are called, are 220 ft. long and 22 ft. broad. They are armed with two 14-pdr. and two 6-pdr. Maxim-Nordenfelts, and two 1·4-in. Maxims. Two other boats of this class, the Andaz and Osado, of 400 tons and 30 knots speed, have been ordered in England.

Important orders have been placed abroad. As already mentioned, the Italian armoured cruiser building by Messrs. Ansaldo was bought and re-named the Cristobal Colon. She was launched on 16th September. The Cristobal Colon has Niclausse boilers. A second cruiser of the same type, to be named the Pedro d'Aragon, has been ordered from the same firm.

The battleships Pelayo and Vitoria have been sent to La Seyne to be fitted with new armament and new boilers.

The Hong Kong and Whampoa Dock Company has completed, for service in the Philippine Islands, the gunboat Villabobos. Length, 155 ft.; beam, 23 ft.; draught of water, 11 ft.; displacement, 315 tons; horse-power, 500; speed, 11·5 knots.

The Government has asked for a special vote for the construction of a battleship of 11,000 tons, two cruisers of 6800 tons, another

cruiser of 5300 tons intended to replace the Reina Regente, two destroyers, and two tugs. The battleship will be armed with four 9·4-in. guns and sixteen 5·9-in. Q.-F. guns. She will steam 19 knots. The two larger cruisers will be armed with two 7·9-in. and eight 5·9-in. Q.-F. guns. Speed, 21 knots. The boilers will be of the multitubular type.

Looking back on past years, the slow rate of construction in Spain and the delays in completion are very apparent. The great disadvantage of such a system is that when ships are launched they are already out of date, especially with regard to the quality of protection.

Sweden.

The Swedish Government have drawn up a programme of shipbuilding entailing an expenditure of £654,800. Of this sum £300,000 are to be expended this year. The programme has been passed by Parliament, and includes the following ships:—Two coast-defence armour-clads of the Svea type (2900 tons), four torpedo-gunboats, and six first-class torpedo-boats. The torpedo-gunboat Orn, of 670 tons displacement, 4000 I.H.P., and 19 knots speed, and a torpedo-boat of 35 tons displacement and 23 knots speed, have completed their trials.

Bulgaria.

The organisation of a system of maritime defence is under consideration in Bulgaria. Some small vessels are to be built. Prince Ferdinand's Government has asked for the loan of an officer of the French Navy to draw up the programme which it wishes to take in hand.

Turkey.*

A torpedo-gunboat of 840 tons displacement, 5000 horse-power, and 20 knots speed has completed her trials. The Turkish Navy continues to waste away. The small available funds are spent on refits which are indefinitely prolonged and upon the construction of new ships which are never completed.

* Owing to information obtained from Constantinople, a large number of ships have been struck out of the list of the Turkish Navy in Part II. Few of the ships still retained are in a condition to put to sea.

UNITED STATES.

The proposed estimates for 1898 amount to £7,044,328, the expenses for the current year being estimated at £6,288,613.

Administration of President Cleveland.

In his report, the Secretary of the Navy, Mr. Herbert, reviews the progress made during the administration of President Cleveland. The policy of the Department has been to build battleships, torpedo-boats and light draught boats. Since 4th March, 1893, twenty-eight vessels in all have been authorised by Congress to be completed in the following years:—In 1896, three torpedo-boats of 24·5 knots, and two of 27·5 knots. In 1897, one submarine torpedo-boat, one 26-knot, three 30-knot, three 22·5-knot, and four 20-knot torpedo-boats, and six gunboats of 1000 tons. In 1899, the battleships Kearsage, Kentucky, Illinois, Alabama and Wisconsin, of 11,500 tons displacement. Since 1893, twenty-three vessels, representing an aggregate tonnage of 118,184, have been commissioned, while during last year alone eight vessels have been added to the Navy, viz., the Monadnock, Terror, Indiana, Massachusetts, Oregon, Katahdin, Ericsson and Brooklyn.

New programme.

On the subject of the new programme, Secretary Herbert says—"The battleships laid down during the present administration are of lighter draught than those previously completed, being 23 ft. at normal and 25 ft. at extreme draught. This step was in the right direction, but did not go far enough; or perhaps it would be fairer to say that the battleships heretofore laid down, while adapted to the defence of the Atlantic and Pacific coasts, are not as well suited for operations in the Gulf of Mexico." Attention is called to the following recommendations from the President of the War College:—"The close study of the Gulf of Mexico which has been carried on by the Department's orders during the past year shows it to be essential to the success of defensive Naval campaigns that we shall be able to use for our fighting-ships those harbours which nature has provided. Although possessing bases for fleets in that region, the fact that there is not enough depth of water for our fighting-ships to enter them will render them of but slight benefit to us. It is submitted, further, that the artificial deepening of channels and entrances is not a good solution of this difficulty. The true remedy, in the opinion of the War College, lies in decreasing the draught of warships to a point permitting them to enter these harbours. The College, therefore, suggests that future ships be planned for an extreme load-draught, with maximum coal supply on board of 23 ft., and submits that considerations of strategy upon the Atlantic and Gulf coasts render

this an essential to successful Naval campaigns." Secretary Herbert recommended to Congress the construction of three such battleships and twelve torpedo-boats.

The battleship Iowa was launched on 25th March, 1896, at Messrs. Cramp's yard at Philadelphia. She is of the Indiana type modified. Estimated displacement, 11,300 tons; I.H.P., 11,000; speed, 16 knots. The length of the belt at the water-line has been increased, but its thickness has been diminished from 18 in. to 14 in., and better protection has been given to the auxiliary armament. The belt is 7 ft. 6 in. in depth, terminating at the ends in transverse bulkheads of 12-in. armour. The side above the belt is covered amidships with 5-in. armour up to the level of the main deck. The armoured deck, which is at the water-line, is 2·5 in. thick amidships, and 3 in. thick at the bow and stern. The armament comprises four 12-in. guns, which are coupled in turrets forward and aft, protected by 15-in. armour; eight 8-in. guns, also mounted in pairs in turrets, placed nearly amidships on the upper deck; six 4-in. Q.-F. guns on sponsons, protected by 4-in. shields and 1·75-in. screens; twenty 6-pdrs., six 1-pdrs., four machine guns, and six torpedo-tubes. The axis of the guns in the forward turret is 24½ ft. above the water-line, that of the guns in the after turret is 18 ft. The conning-tower is protected by 10-in. armour. The Iowa has two propellers, driven by vertical triple-expansion engines, to which steam is furnished by double-ended boilers, and by tubular single-ended boilers. On a preliminary trial the Iowa steamed 16·27 knots with 111 revolutions. Iowa.

Three of the six 1000-ton gunboats have been launched—the Vicksburg (ex No. 10) and the Newport (ex No. 11) at Bath, and the Annapolis (ex No. 12) at Elizabeth Port. No. 13 has been named the Princetown, No. 14 the Wheeling, No. 15 the Marietta. The three latter will be ready shortly.

Amongst the torpedo-boats which have been launched is one of 185 tons displacement, built by Herreshoff. She has three multitubular boilers, which should develop 3500 horse-power. Estimated speed, 27·5 knots. She is armed with three torpedo-tubes and four 1·4-in. Q.-F. guns.

The three battleships, Alabama, Wisconsin, and Illinois, authorised by Congress, are building at the Newport News Company's yard, Virginia, at the Union Ironworks of San Francisco, and by Messrs. Cramp, of Philadelphia. The prices to be paid to these companies respectively are £518,000, £535,000, and £530,000. Length between perpendiculars, 368 ft.; beam, 72 ft.; mean draught, 23 ft. 6 in.; displacement, 11,525 tons; I.H.P., 10,000; speed, 16 knots. The Alabama, Wisconsin, Illinois.

freeboard forward is 19½ ft. and aft 13½ ft., the axis of the forward guns being 26½ ft. and of the after guns 19 ft. above the water-line. Armament:—Four 13-in. guns, fourteen 6-in., sixteen 6-pdr. and four 1-pdr. Q.-F. guns, four machine guns and one field gun. Protection is to be afforded by a belt of a maximum thickness of 16½ in. and a mean depth of 7 ft. 6 in. It is to extend from the stem to the after barbette, and to maintain the maximum thickness abreast the engines and boilers. From thence it tapers gradually to a thickness of 4 in. Above the belt will be 5½ in. of steel amidships, with coal behind. The transverse bulkheads will be 12 in. thick, and the barbettes for the 13-in. guns will have 15-in. armour. There will be a protective deck from 3 in. to 5 in. thick, and a coffer-dam with cellulose is to be fitted along the whole length. The conning-tower is of 10-in. steel armour, with armoured communication tubes, surmounted by a heavy fighting-tower rising to an elevation of over 60 ft. above the water-line. A second armoured station will be located aft. In the way of the 6-in. guns on the main deck between the turrets is 5½-in. continuous armour, further protection being afforded by 1½-in. splinter bulkheads extending from deck to deck. The 6-in. guns on the upper deck will also be protected by 5½ in. of armour with 1½-in. splinter bulkheads in between. The eight boilers are to be of the cylindrical single-ended pattern, placed in four compartments. The designs of these ships are similar to those of the Kearsage and Kentucky, with the exceptions of the changes consequent upon the abandonment of the superposed turret. The normal coal supply is 800 tons, the total bunker capacity being 1200 tons.

Trials of ships. Brooklyn.

The trials of the armoured cruiser Brooklyn, of 9250 tons displacement and 16,000 horse-power, have been brilliantly successful.* On 27th August she steamed eighty-three miles on a base at a mean speed of 21·9 knots with 138 revolutions. For a distance of seven miles she maintained a speed of 22·9 knots. Messrs. Cramp, the builders, received a premium of £70,000 for the excess over the contract speed of 20 knots. The Americans no longer give premiums for speed. The Brooklyn has two propellers driven by triple-expansion engines and seven boilers. The hull of the Brooklyn is extensively subdivided. The hold of the ship below the armoured deck is divided by twelve transverse and two longitudinal bulkheads. The space above the armoured deck is divided into 140 compartments. The upper part of the ship is divided by ten transverse bulkheads. The coffer-dam along the sides above the armoured deck is filled with

* The displacement of the Brooklyn on trial was only 8150 tons. The speed at load draught will be considerably less than that given in the text.—Ed.

cellulose up to the level of the battery deck. This is the same system of construction that has already been adopted in the New York and the commerce destroyers Minneapolis and Columbia. The coffer-dam is supported for a length of 192 ft. 6 in. by 3 in. Harveyed steel plates. There is no armoured transverse bulkhead. The disposition of the armament and other particulars were given in the *Naval Annual* of last year. The contract for the Brooklyn was signed in January, 1893. She was launched in October, 1895, and was practically completed in three-and-a-half years.

Massachusetts. Oregon. The Massachusetts and Oregon, which have been already described in the *Annual*, have completed their trials. The third ship of this type, the Indiana, was in commission last year. These ships are of 10,288 tons displacement and 9000 horse-power, and carry a powerful armament of four 13-in., eight 8-in., and four 6-in. guns, besides twenty-eight small quick-firers and machine guns. The Massachusetts, which was built by Messrs. Cramp, steamed 16·2 knots, while the Oregon, built at San Francisco, attained a speed of 16·78 knots on her trials, but this speed was subject to tidal correction.

The Detroit on her forced draught trials steamed 19·2 knots with 4096 horse-power.

In the American Navy numerous experiments have been made with both guns and armour. The manufacture of both is carried on in the most scientific manner. There is a disposition shown to adopt the multitubular boilers of the European Navies, but experiments are being made on a small scale before any decisive step is taken. For this reason the newer American ships are in this respect behind many of the more recent vessels built for European Navies.

Amongst the miscellaneous facts which should be mentioned is the sinking of the Texas in the dockyard at Brooklyn, owing to the bursting of a pipe. She was floated without difficulty. Some trouble has arisen between the contractors for the armour of the Kearsage and Kentucky and the representatives of the Marine Department. According to the American newspapers, the plates delivered for these two ships do not fulfil the conditions of the contract, and cannot stand the test to which they were to be subjected.

Holland. The submarine boat Holland has not yet been tried. The displacement when light is 118 tons, and when the boat is completely submerged 138 tons, the speed under these conditions being 14 and 8 knots respectively. The machinery has a maximum I.H.P. of 1800, and is driven by steam generated by petroleum when the funnel is out of water, and by electricity when under water. The fertility of the American genius for invention has produced numerous designs of boats for submarine navigation.

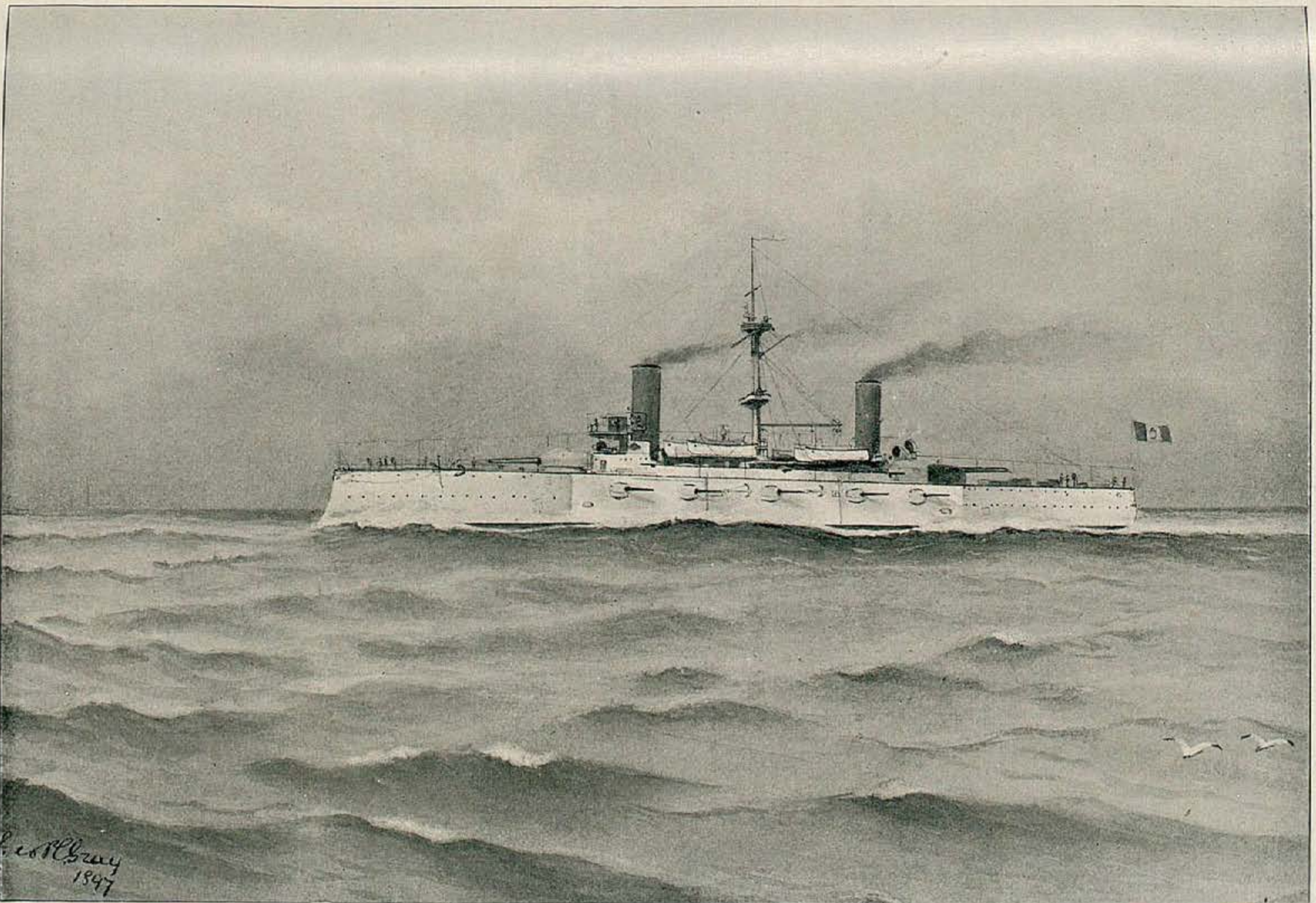
Argentine Republic.

Most of the South American republics are increasing their Navies, and there is hardly a year when we do not have to chronicle some important additions. The Argentine Republic have bought the armoured cruisers Garibaldi and Varese (re-named San Martino), built for the Italian Government. They were described in the *Naval Annual* last year. Length between perpendiculars, 328 ft.; beam, 59 ft. 3 in.; maximum draught, 24 ft.; displacement, 6840 tons; horse-power, 13,000. The armament of the Garibaldi includes two 10-in. guns mounted in barbettes and protected by hoods, ten 6-in. Q.-F. guns in the central redoubt, six 4·7-in. Q.-F. guns on the upper deck protected by shields, twenty-two smaller Q.-F. guns, and four torpedo-tubes. The San Martino carries two 8-in. Q.-F. instead of the two 10-in. guns. All the guns were supplied from Armstrong's works at Pozzuoli. The mean speed of the Garibaldi for six runs on a measured mile is said to have been 19·98 knots, the maximum speed being 20·36 knots, with 13,384 horse-power and 104 revolutions.*

The four destroyers of the Sokol type, which we mentioned last year had been ordered from Messrs. Yarrow, have been named Santa Fé, Corrientes, Missiones, and Entre Rios. Length, 190 ft.; beam, 19 ft. 6 in.; displacement, 240 tons; horse-power, 4000. There are six Yarrow boilers. They are armed with three torpedo-tubes, one 14-pdr. and three 6-pdr. Q.-F. guns, and two Maxims. The leading feature in the construction of these vessels is that the sides and deck for the length of the machinery and boiler space are protected with ½-in. steel plating. The contract speed for these boats was 26 knots for three hours, carrying a load of thirty-five tons. The speeds obtained on trial were:—Santa Fé, 26·52 knots; Entre Rios, 26·76; Missiones, 27·06; Corrientes, 27·4. Some of these boats have left for their destination. "On the passage out it was found that a saving of 10 per cent. in fuel was effected, running at a speed of 10 or 11 knots, by using one engine only and disconnecting the screw of the other."—*Engineer*. The Corrientes, which left in January, met with very heavy weather in the Bay of Biscay, and had to put back for repairs.

The Almirante Brown has been sent to France to be refitted and re-armed. The eight 8-in. guns are to be replaced by ten 5·9-in. Q.-F. guns, of which six will be mounted in the battery, two forward and two aft.

* The conditions under which these trials were made have been questioned.—Ed.



"GARIBALDI,"

ARMOURED CRUISER.

Brazil.

The three torpedo-gunboats, Caramaru, Timbiva and Tupy, have been launched from the Germania yard at Kiel. Length, 259 ft.; beam, 31 ft.; draught of water aft, 10 ft. 2 in.; displacement, 1030 tons. The armament consists of two 4-in., six 2·2-in., and four 1·4-in. Q.-F. guns, and three topedo-tubes. Horse-power, 6000; speed, 23 knots. The radius of action is 3000 miles at 10 knots. The Timbiva has been handed over by the contractors.

Barroso. Amazonas

The cruisers Barroso and Amazonas, which are similar ships to the Chilian Zenteno, have been launched at Elswick, where a third vessel of the same type is under construction. Displacement, 3600 tons; length, 330 ft.; beam, 43 ft. 9 in.; draught, 17 ft. These vessels are sheathed with wood and coppered, and are protected by a 3-in. armoured deck extending from stem to stern. The two engines are to develop 7500 horse-power; speed, 20 knots. The coal supply at load draught or normal coal supply is 700 tons. The armament comprises six 6-in., four 4·7-in., ten 2·2-in., and four 1·4-in. Armstrong Q.-F. guns, four Maxims, and three torpedo-tubes. The 6-in. guns are arranged to fire three ahead and three astern. These, as well as the 4·7-in. guns, are of 50 calibres.

Marshals Deodoro and Floriano.

The two coast-defence ships ordered from the Forges et Chantiers de la Méditerranée have been named the Marshal Deodoro and the Marshal Floriano. Their construction was suspended for some time owing to the modifications which the Brazilian Government wished to introduce into the design. Length, 267 ft. 6 in.; beam, 47 ft. 3 in.; maximum draught, 13 ft. 2 in.; displacement, 3162 tons. There are two vertical triple-expansion engines of 3400 horse-power, to which steam is supplied by eight Lagrafel d'Allest boilers. Speed with natural draught, 14 knots, with modified forced draught, 15 to 15½ knots. Protection is afforded by an armoured belt 5 ft. 6 in. in depth amidships, the thickness of which varies from 13¾ to 4 in., and by a 1·3-in. armoured deck. The total weight of the armour is 1053 tons. The armament comprises two 9·4-in. Armstrong guns, four 4·7-in. Q.-F. guns, two 6-in. howitzers, four 6-pdrs., two 1-pdrs., and two machine guns, besides two field pieces and two torpedo-tubes. The 9·4-in. guns are mounted in turrets protected by 8-in. Harveyed steel. The 4·7-in. guns are in small casemates of 2·9-in. armour. The coal capacity will be 236 tons, and the complement 200 men.

The torpedo-gunboat Timbiva, built at the Germania yard, has left Kiel for Brazil.

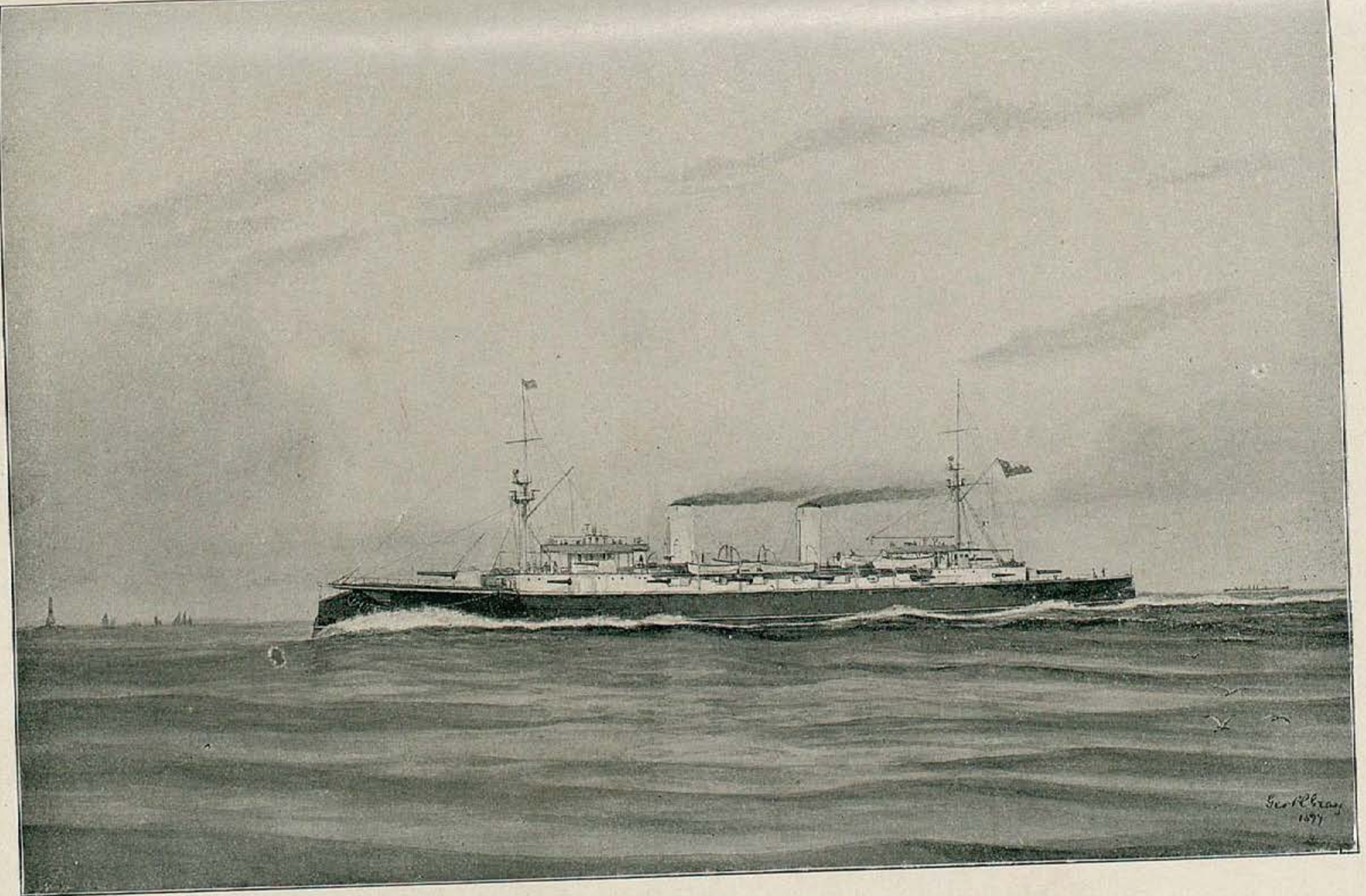
CHILI.

O'Higgins. A battleship of 8500 tons, the General O'Higgins, has been laid down at Elswick. Length, 400 ft.; beam, 62 ft.; draught, 22 ft. The contract speed is 21¼ knots with natural draught. Armament: Four 8-in., ten 6-in., four 4·7-in. Armstrong Q.-F. guns, eight 12-pdrs. and ten 6-pdrs., and four submerged torpedo-tubes. Protection for the hull is afforded by a Harveyed steel belt, 7 in. thick, and by an armoured deck. The gun-houses or turrets of the 8-in. guns and the casemates of the 6-in. guns are protected by 6 inches of nickel steel.

Almirante Molinas. The dimensions of the Almirante Molinas are:—Length, 295 ft. 3 in.; beam, 32 ft. 6 in.; draught of water aft, 12 ft. 10 in.; displacement, 1200; horse-power, 6000; speed, 22 knots. Armament: Two 4·7-in., six 1·8-in., four 1·4-in. Q.-F. guns, two machine guns, and four topedo-tubes.

Esmeralda. The armoured cruiser Esmeralda has been completed at the Elswick yard. The principal dimensions of the vessel are as follows: Length between perpendiculars, 436 ft.; extreme breadth, 53 ft. 2 in.; mean draught, 20 ft. 6 in.; displacement at load draught, 7020 tons. The cruiser is sheathed with wood and coppered. Protection is afforded by a belt of 6-in. armour 7 ft. in depth, which extends for about 350 ft. of the length, and is terminated by 6-in. transverse bulkheads. All her machinery, magazines, and steering-gear are protected by a curved armoured deck which varies in thickness from 1½ in. in wake of the armour belt to 2 in. at the ends. The coal bunkers are situated above the protective deck, and when filled with coal will add to the water-line protection of the ship. Bunker space is provided for 1350 tons of coal. The armament consists entirely of Elswick quick-firers, viz., two 8-in. guns with heavy shields placed one forward and one aft, sixteen 6-in. guns, with 4½ in. shields, four of which are placed on the flying deck forward and aft, and twelve on the upper deck. Four of these fire right ahead, and four right astern, while eight can be trained on each broadside. The minor armament consists of eight 12-pdrs., ten 6-pdrs., and four Maxim guns. The distribution of the armament can be easily seen in the illustration on the opposite page.* She carries three torpedo-tubes, one fitted in the stem above the water-line, and two on the broadsides. The trials passed off satisfactorily, and a speed of 23·03 knots was obtained with natural draught, the stipulated speed being 22¼ knots. The Esmeralda is one of the most powerful cruisers in the world. She has sailed for Chili.

* *Cf.* also plate 36 in Part II.



"ESMERALDA,"

CHILIAN ARMOURED CRUISER.

Messrs. Laird Brothers, of Birkenhead, have completed the torpedo-gunboat Almirante Simpson. She is an improvement on the Almirante Lynch built by the same builders for Chili some years back. Length, 240 ft.; beam, 27 ft. 6 in.; depth, 16 ft.; displacement, 800 tons. The machinery consists of twin-screw triple-expansion engines of 4500 I.H.P. The boilers are of the Normand water-tube type. The estimated speed is 21 knots. The plating of the sides and deck for the length of the machinery space is increased in thickness to afford better protection. Armament: Two Armstrong 4·7-in. Q.-F. guns, four Maxim 3 pdrs., and three torpedo-tubes for 18-in. torpedoes. The mean speed on trial was 21·5 knots. The increase in speed obtained in the Simpson is due to the lesser weight of the tubulous boilers as compared with the locomotive boilers of the Lynch and Condell. **Almirante Simpson.**

The four destroyers built by Messrs. Laird have been launched and have completed their trials. The respective speeds obtained for three hours' steaming were: Capitan Orella, 30·23 knots with 362 revolutions; Capitan Munoz Gamero, 30·08 knots with 364 revolutions; Teniente Serrano, 30·25 knots with 370 revolutions; Guardia Marina Riquelme, 30·12 knots with 362 revolutions.

Messrs. Yarrow, of Poplar, are building six torpedo-boats of 106 tons, of the Austrian Viper type. Guaranteed speed 25·5 knots. The speed reached by the first of these boats, the Cirujano Videla, was 26·79 knots, carrying a load of twenty-five tons. The second, Injeniero Hyatt, has steamed 27·2 knots.

The Almirante Cochrane is being refitted. The old masts are being replaced by one military mast, and four 4-in. Q.-F. guns are being added to the armament.

A steam-pipe burst on board the Huascar in April, 1896, killing eight men and wounding others.

Another cruiser is about to be laid down at Elswick, the dimensions of which are not yet settled.

JAPAN.

The programme for the increase of the Japanese Navy seems to be finally settled. It is divided into two periods, in the first of which fifty-four ships of an aggregate displacement of 45,890 tons are to be completed by 1902, and in the second of which sixty-three vessels of a total displacement of 69,895 tons are to be completed by 1906. In the first series are included one battleship, two first-class cruisers, three second-class cruisers, one torpedo-gunboat, eight destroyers, five first-

class, twenty-eight second-class, and six third-class torpedo-boats. In the second series are included three battleships, two first-class cruisers, two third-class cruisers, two torpedo-gunboats, one torpedo-depôt-ship, three destroyers, eighteen first-class, three second-class, and twenty-nine third-class torpedo-boats. This programme will probably be modified, as generally happens with programmes covering a long period.

New battleship.

A contract has been secured by the Thames Ironworks and Shipbuilding Co. for the construction of the battleship referred to above, which will possibly be the most powerful battleship yet constructed. The largest armour-clads in the English Navy are of 14,900 tons displacement. Deducting 900 tons of coal carried at load draught, only 14,000 tons remain for the weight of vessel, engines, equipment, and armament; whereas in the new Japanese vessel, at present nameless, with a displacement of 14,850 tons, and a coal-carrying capacity of 700 tons only, we have 14,150 tons for the weight of vessel, etc., which is 150 tons more weight in hull, engines, and armament than in the Majestic class. The dimensions are as follows: Length between perpendiculars, 400 ft.; length over all, 438 ft.; beam, 75 ft. 6 in.; draught of water, 27 ft. 3 in. The armour is to be of Harveyed nickel steel. The belt, which extends from stem to stern, is 8 ft. 2 in. in depth, and 9 in. thick throughout engine, boiler, and magazine spaces, tapering at the ends from 7 in. in thickness to 4 in. Above the belt the side is covered with 6-in. armour to the height of the main deck and for a length of 250 ft., enclosing the two barbettes. At each end of the belt there is a curved bulkhead 14 in. thick between the armoured and the main decks, thus forming a complete citadel 250 ft. long. Between the main and upper decks screen bulkheads are also worked extending from the barbettes to the ship's side. Within the armour belt, rising from its lower edge to a height of about 3 ft. above the water-line amidships, is a complete armoured deck extending from stem to stern, 3 in. thick on the flat part and 5 in. thick on the slopes, but tapering at the ends. The vessel is constructed on the usual system of double bottom, connected with watertight flats at the ends of vessel, thus extending the double bottom to the extremities of the ship.

The barbettes are placed at the centre line forward and aft. They are circular in plan, and protected with 14-in. armour, rising to a height of 4 ft. above the upper deck. Each barbette carries two 12-in. B.-L. guns of 40 calibres. The fourteen 6-in. Q.-F. guns are also of 40 calibres, each mounted in an armoured casemate of 6-in. Harveyed nickel steel. Eight casemates are placed on the main deck and six on the upper deck, fitted with the usual dis-

mounting and stowing gear. The casemates are made watertight both on the inner and outer sides, by which means the men at the guns are protected from any explosive shells that might enter between decks, and this also prevents water entering between decks should the gun port get damaged. In addition to the above there are twenty 12-pdrs. placed on the upper deck and twelve 6-pdrs. on the upper and main decks, in the military tops, etc. There are five 18-in. torpedo-tubes, one in the stem above the water-line, and four submerged. The vessel is fitted with the usual torpedo-net defence.

The propelling machinery will be supplied by Messrs. Humphreys, Tennant and Co., and will be of 14,500 I.H.P. with the latest type of Belleville boiler. The main engines are triple-expansion, driving twin-screws. The boilers will be twenty-five in number, with a total heating surface of nearly 40,000 square feet. The speed of the vessel is to be not less than 18 knots.

The complement will be 741 all told, including an Admiral and thirty-eight officers.

The vessel has been designed by Mr. J. C. Mackrow, naval architect to the Thames Ironworks, in accordance with the views of the Japanese Naval authorities, and a Naval commission in London presided over by Captain Yendo, Naval Attaché to the Japanese Legation. The time for the completion of the vessel is twenty-three months.

Commerce destroyers.

Two protected cruisers of the commerce-destroyer type have been ordered from Messrs. Cramp, of Philadelphia, and from the Union Ironworks of San Francisco. Length over all, 405 ft. 2 in.; length on the water-line, 396 ft.; beam, 49 ft.; normal draught, 17 ft. 7 in.; displacement at load draught, 4760 tons; speed, 22½ knots. Two engines of the vertical, inverted, triple-expansion type will drive twin-screws and develop 15,500 horse-power. Four double-ended and four single-ended steel boilers, constructed for a working pressure of 165 lbs. per square inch, will be placed in four watertight compartments. The total heating surface will be about 22,440 square feet, and the grate surface 792 square feet. The forced draught system will consist of a blower for each boiler-room, the boiler-rooms being made airtight by air locks. The ships will have a double bottom and a protective deck extending the entire length. The thickness of the deck will be doubled over the engines, boilers and magazines. The conning-tower, located on the after part of the forecastle deck, will be armoured; an armoured communication tube will extend from it to the protective deck. In addition to the propelling engines, there will be forty auxiliary engines. Each ship will have an electric plant that will supply a current to 500 incandescent lamps and to two

powerful search lights. Two electric motors will drive ventilating fans having an aggregate capacity of 20,000 cubic feet of fresh air per minute. Each ship will carry two 8-in. guns, ten 4·7-in., twelve 12-pdr., two 6-pdr., and two 2½-pdr. Q.-F. Five torpedo-tubes will be fitted in each ship.

A cruiser of 4150 tons has been laid down at Elswick: Length, 360 ft.; beam, 46 ft. 6 in.; draught, 17 ft. The coal capacity is 1000 tons, and the estimated speed 23 knots. The armament consists of two 8-in., ten 4·7-in., and twelve 12-pdrs., besides smaller quick-firers. There are five torpedo-tubes.

New cruiser.

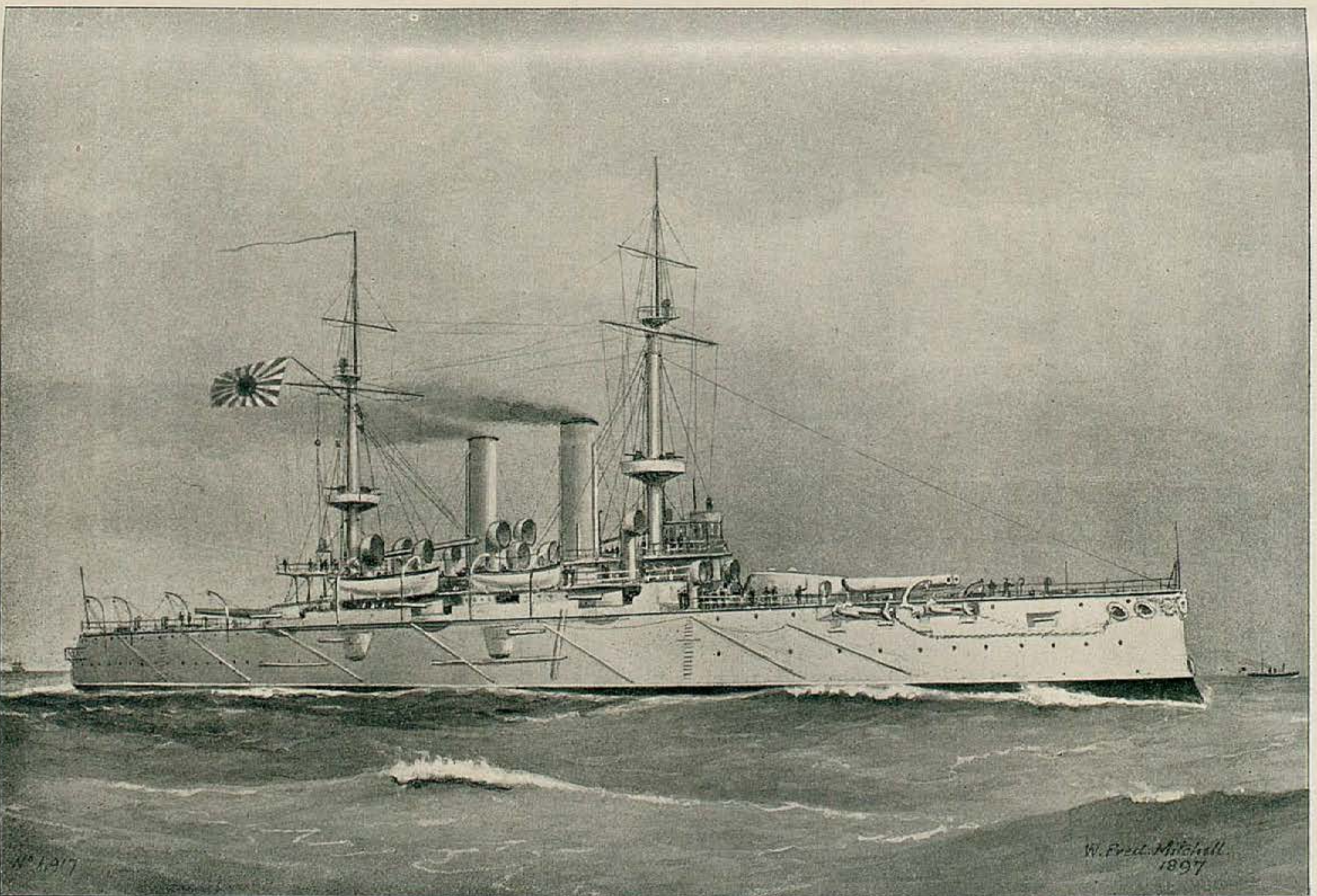
The battleship Fuji, which was launched from the Thames Ironworks on 31st March, 1896, is to be ready for her trials in March;* the sister ship Yashima, which is building at Elswick, in April.

China.

The Chinese Empire is endeavouring to resuscitate the Navy which was destroyed in the war of 1894–5. A programme of shipbuilding extending over five years is under consideration. It is said to include six battleships, twelve armoured cruisers, and twenty second and third-class cruisers, besides destroyers. A commission presided over by a French Naval Constructor is re-organising the dockyard at Foo-Chow.

Several ships have been ordered in Europe. Two protected cruisers are building at Elswick. Length between perpendiculars, 400 ft.; beam, 47 ft.; draught, 18 ft. 6 in.; displacement, 4500 tons. The contract speed is 24 knots, to be maintained for four hours. Armament: Two 8-in., ten 4·7-in., sixteen 3-pdr. Q.-F. guns. The Vulcan yard at Stettin has received the order for three cruisers. Length, 328 ft.; beam, 41 ft.; draught of water aft, 16 ft. 6 in.; displacement, 2950 tons. Engines of 8000 horse-power are to give a speed of 19·5 knots. The armament, which is to be supplied by Elswick, includes three 5·9-in., eight 4-in., six 1·4-in. Q.-F. guns, and four torpedo-tubes. The normal coal supply is 220 tons, and the complement 250 officers and men. Four large destroyers of 6000 horse-power and 32 knots speed have been ordered from Herr Schichau. A cruiser of 1800 tons, named the Kin Ching, is completing at Foo-Chow. She will be armed with Q.-F. guns, and will be attached to the Naval Academy of Tientsin.

* The Fuji on her natural draught trials steamed 16·8 knots with 10,200 I.H.P. On the forced draught trials a speed of 18·58 knots was obtained with 14,100 I.H.P. and 120 revolutions.



"FUJI,"

JAPANESE BATTLESHIP.

Mexico.

An armoured gunboat is being built for the Mexican Government at New Orleans, for use on the Mexican rivers and the coast of Yucatan. Length, 65 ft.; beam, 24 ft.

St. Domingo.

The gunboat Restauration has been built by Messrs. Napier. Length, 213 ft. 3 in.; beam, 30 ft.; speed 14 knots. She is armed with Hotchkiss quick-firers.

Liberia.

The gunboat Rocktown has been built at Amsterdam. Length, 100 ft.; beam, 20 ft.; speed, 12 knots. Armament: One 3·9-in. and three 3·1-in. Q.-F. guns.

CHAPTER III.

Relative Strength.

No year since the *Naval Annual* was first published has been so full of anxiety for those at the helm of the British Empire, in no year has there been such imminent danger of war, as in the one just passed away. At the moment of writing, the action of the Greeks in Crete is giving fresh cause for anxiety. In former years we used to confine the comparisons made in this chapter to the fleets of France and Russia; but during the past year it has become more and more evident that we must take into consideration the Navies of all the principal Naval Powers. We have been in a position to hold our own against our probable enemies. Our Navy is practically equal in strength to the combination of any two foreign Navies. Is the standard of strength hitherto accepted sufficient?

There has been little change in the relative position since last year. Both in England and in France powerful battleships have been completed. In France and Russia the sums allotted to new construction in this coming year are slightly reduced. In Italy the drain on the resources of the country by the attempt to create an empire in Africa has seriously hindered the progress of her Navy. In Germany, on the other hand, there is a decided increase in shipbuilding activity. The arguments by which Admiral Hollman recommended the proposals for the increase of the German Navy, to which allusion has been made in the previous chapter, are even more worthy of attention than the proposals themselves, as they indicate a new departure in German policy. The gist of them was that Germany must be in a position to fight with strong forces on sea as well as on land, and that a position of power in the world can only be assumed by Germany if she has a powerful Navy. The people of the United States seem to be determined to take a position amongst the Naval Powers of the world. Though Congress did not accede to all the demands of the Secretary of the Navy, it authorised the construction of some powerful ships in addition to those already building. By the end of the century the United States will possess a fleet of some

GREAT BRITAIN. — FRANCE. (From *Le Yacht*, February 27th.)

	Great Britain: Mediterranean Fleet.	Great Britain: Channel Fleet.	Great Britain: Reserve Squadron.	France: Mediterranean Fleet.		France: Northern Squadron.
				Permanent Squadron	Reserve Squadron.	In full commission 4 months.
Battleships	Anson Barfleur Camperdown Hood Nile Ramillies Revenge Royal Oak Rodney Trafalgar	Majestic Magnificent Prince George Empress of India Repulse Resolution Royal Sovereign	Alexandra Benbow Collingwood Colossus Edinburgh Devastation Inflexible Sans Pareil Thunderer Conqueror Hero	Brennus Jauréguiberry Charles Martel Hoche Marceau Magenta Neptune Baudin * Redoutable Courbet (Toulon)	Dévastation Friedland Duperré Caiman Terrible	Hoche Bouvines Tréhouart Jemmapes Valmy
Coast Defence Ships.	Rupert (Gibraltar) Orion (Malta)	..	..	..	Achéron ‡ (Toulon)	Flamme ‡ (Dunkirk)
Cruisers, 1st-Class	Hawke Theseus	Blake Blenheim	Australia Galatea	Charner	Chanzy Latouche Tréville	Dupuy de Lôme Bruix
Cruisers, 2nd-Class	Astræa Cambrian Forte Scylla Sybille	Charybdis Hermione	Mersey Melampus	Bugeaud Suchet	..	Friant
Cruisers, 3rd-Class, or Look-out Ships	Blanche Fearless Scout Surprise	Bellona	..	Cosmao, Faucon Linois, Troude Vautour, Wattignies	Forbin Milan Condor (Tunis)	Epervier
Torpedo-Gunboats	Dryad, Gleaner Hebe, Skipjack	Halcyon Speedy	Leda, Niger Onyx, Renard Sharpshooter Sheldrake Spanker	Casabianca D'Iberville Lévrier Salve Flèche	Léger Couleuvrine (Algeria)	Cassini Lance St. Barbe (Granville)
Torpedo-Ram	Polyphemus	..	..	..	..	..
Destroyers	5	..	16	4†	2†	3†

* To be refitted. † Sea-going torpedo-boats. ‡ Armoured gunboats.

eight first-class battleships. Japan has started on her ambitious career somewhat later in the day, but by the close of the year she will possess two powerful battleships, and there is no indication that she will relax her efforts to create a powerful Navy. A contract has recently been made with the Thames Ironworks for the construction of a battleship of 14,850 tons. The South American Republics continue to obtain from Elswick some of the fastest cruisers in the world.

Ships in commission. Mediterranean.

To deal first with ships in commission. Not much change has taken place during the past year in the relative strength of the squadrons of Great Britain and France in European waters. The British Mediterranean Squadron still consists of ten first-class battleships. Two of the Royal Sovereign class—the Revenge and Royal Oak—have taken the place of two of the older and less powerful Admiral class. The French Permanent Mediterranean Squadron consists of eight battleships, one of which is of the second-class. The French Reserve Squadron comprises five ships, three of which are of the second-class. Before, however, the *Naval Annual* is published, three powerful battleships, which are at present going through their trials, will be ready for commission. The Charles Martel,* Carnot, and Jauréguiberry * will probably be attached to the Permanent Squadron in place of the old second-class battleship Redoutable and the Amiral Baudin, which is to be refitted and re-armed like her sister ship the Formidable. If these anticipations are realised, the French Naval forces in the Mediterranean will receive a greater accession of strength than that received by the British forces during the past year. The cruiser strength of both the French Squadrons is still weak. In the Permanent Squadron one first-class, two second-class, and five third-class cruisers are in commission. In the Reserve Squadron there are two third-class cruisers, besides the guardship in Tunis. The cruiser strength of the British Squadron, on the other hand, has been considerably increased of recent years. Last year the first-class cruiser Theseus was added to the squadron, and, with the Forte, has been temporarily detached for service on the west coast of Africa.† The French torpedo-boat flotilla remains about the same, while the destroyers Banshee, Boxer, Bruiser, and Dragon have been added to the British Squadron.

Increase of Russian strength.

We have hitherto maintained in these pages, in opposition to views expressed elsewhere, that the strength of the British Squadron was sufficient to enable it to hold its own in the Mediterranean till reinforced from its proper reserve, the Channel Squadron. Until the

* These ships are already in commission.—Ed., March 10th.
† Now returned to Malta—Ed., March 20th.

docks at Gibraltar are completed there are grave practical objections to further augmenting the squadron, though the large increase of the Russian strength in the Mediterranean waters during the past year may render it desirable to do so as soon as possible. In 1896 the Russian Mediterranean Squadron consisted of the battleships Navarin, the armoured gunboat Grosjastchy, and the sloop Zaporetz. In addition to the above, it now includes the second-class battleships Nicolai I. (recently returned from the China station), Sissoi Veliky (just completed), and Alexander II., the new coast-defence ship, Admiral Seniavin, and some torpedo craft. In the Black Sea a squadron of five battleships—viz. Catherine II., Tchesmé, Sinope, Twelve Apostles, and George the Victorious—besides several auxiliary cruisers of the Volunteer Fleet, were kept ready for sea, with steam up, all through the time of the troubles in Crete. The latter force, with one exception, was in commission last year; but the presence of the powerful Russian Squadron in the Mediterranean seriously alters the situation. The combined strength of France and Russia in the Mediterranean is eight first-class and four second-class battleships. If we include the French Reserve Squadron, and the new ships which will probably be substituted for the older vessels, the strength of the combined squadrons will be twelve first-class and seven second-class battleships. If the French Reserve Squadron is included in the comparison, it is only fair to include the English Channel Squadron. We should then have seventeen first-class battleships, most of which would be individually more powerful than the French and Russian ships, while as a fleet our forces would have a marked superiority in speed.

Channel Squadron.

To the British Channel Squadron two second-class cruisers have been added, and the newly completed battleship Prince George has been attached, it is said, temporarily. The French Northern Squadron remains about the same, with the exception that the armoured cruiser Bruix has been substituted for the Chasseloup-Laubat. The British Reserve Squadron, consisting of coast guard-ships and port guard-ships and tenders, now includes three first-class, five second-class, and two third-class battleships, two armoured and two second-class cruisers, besides several torpedo gunboats. It should be a sufficient answer to the French Northern Squadron.

Whether we can treat the Channel Squadron as the Reserve of the Mediterranean Squadron depends on whether our Reserve Squadron in home waters is capable of carrying out the duties that would be imposed on it. It should be capable of dealing with the French Northern Squadron, which it outnumbers by two to one, though its speed as a fleet is inferior. A combination between

France and Russia would only mean at this moment the addition of two second-class battleships—the Gangoot and Peter Veliky—to their strength in northern waters.

To sum up, we have in commission or partial commission in European waters twenty first-class, six second-class, and two third-class battleships. The French have ten * of the first-class and eight of the second-class, including the Valmy and Jemmapes. The Russians—including both the Mediterranean and Black Sea Fleets—have five first-class and four second-class battleships in commission. The following comparison may then be made :—

	England.	France and Russia.
1st-class battleships	20	15
2nd-class ,,	6	12
3rd-class ,,	2	0
	28	27

The force that we maintain in commission may be pronounced sufficient for our needs.

Reserves. Turning to reserves, we have available two first-class battleships—the Renown and Victorious ; four second-class battleships—the Ajax, Agamemnon, Neptune, and Superb ; eight third-class battleships—the Hercules, Sultan, Bellerophon, Triumph, and four ships of the Audacious class; and six coast-defence ships. Most of our modern first-class cruisers are in commission, either in our squadrons or carrying reliefs. No class of ship recently built for the British Navy has been worked harder than that most satisfactory Edgar class. The French have available for sea, at short notice, only the three wooden second-class battleships Colbert, Richelieu, and Trident, besides a few coast-defence ships and armoured gunboats. The Charles Martel is, however, very nearly ready for sea ; but so are several of our Majestic class. The Formidable, Indomptable, and Requin are undergoing a thorough refit.

No practical change has taken place since last year in the strength of the squadrons maintained in commission by Germany and Italy.

On foreign stations outside the limits of European waters the British Squadrons have been in many cases very materially strengthened—in some cases owing to actual additions, in others owing to the carrying out of the policy which was urged in these pages last year, viz. the substitution of second or third-class cruisers for the sloops and gunboats, which are of such small value for war purposes.

* Temporarily 12.—Ed., March 10th.

SHIPS IN COMMISSION.

ATLANTIC.

Class.	British.		French.
	Cape.	America.	
1st-Cl. Cruisers .	Gibraltar St. George	Crescent ..	
2nd-Cl. Cruisers .	Fox	Talbot Intrepid Retribution Indefatigable	Dubourdieu
3rd-Cl. Cruisers .	Barrosa Blonde Philomel Phœbe Racoon	Pallas Tartar Cordelia	Rigault de Geno-[uilly
Sloops and 1st-Cl. Gunboats . .	4	6	1
Battleship . . .	*In reserve (Capetown)* Monarch*		

* Sent to Cape by Mediterranean and East Coast of Africa.

PACIFIC.

Class.	British.		French.
	Australian.	Pacific Station.	
Armoured Cruiser	Orlando	Impérieuse	
2nd-Cl. Cruiser .	..	..	Duguay Trouin
3rd-Cl. Cruisers .	Katoomba Mildura Ringarooma Tauranga } *In reserve* Wallaroo } (*Sydney*) Pylades Rapid Royalist	Comus Satellite	
Sloops and Gun-boats	3	3	1
Torpedo-Gunboats	2 (1 in reserve)		

EAST INDIES.

Description of Ship.	British.	French.
2nd-Cl. Cruiser . . .	Bonaventure	
3rd-Cl. Cruisers . . .	Brisk Cossack Marathon	La Perouse Fabert
Sloops and Gunboats . .	3	2
Torpedo-Gunboats . .	2 (1 in reserve)	
Coast-Defence Ships . .	Magdala *In reserve (Bombay)* Abyssinia	

CHINA.

Class.	British.*	French.	Russian.*
Battleship . .	Centurion		
Armoured Cruisers	Immortalité Narcissus Undaunted	Bayard	Admiral Nachimoff Dimitri Donskoi Pamyat Azova Rurik
1st-Cl. Cruiser .	Grafton		
2nd-Cl. Cruisers .	Iphigenia Pique Rainbow Spartan	Isly Descartes	Admiral Korniloff
3rd-Cl. Cruisers .	Archer Porpoise	Eclaireur	
Sloops and 1st-Cl. Gunboats . .	9	2† *In reserve (Cochin China)*	5
Coast-Defence Ships. . .	Wivern (Hong Kong)	Triomphante‡ Styx ‖	Gremiastchy ‖ Otvazny ‖
Torpedo-Gunboats or Destroyers .	2	..	2

* The Powerful is to be added to the British Squadron, and the Rossia and Vladimir Monomach will probably be added to the Russian Squadron during the year.

† Excludes river gunboats.

‡ Now classed as "Ponton Stationnaire."

‖ Armoured gunboats.

To the Cape Squadron the first-class cruiser Gibraltar and the second-class cruiser Fox have been added in place of two gunboats. The Monarch, efficient at least in speed after her refit, is being substituted for the Penelope. On the American Stations, three second-class cruisers have taken the place of four third-class cruisers and a gunboat, with the result that the efficiency of the squadrons has been materially increased. There is no change of importance to report in the British China, East Indies, Australian, or Pacific Squadrons; but it is well to notice that the removal of the Russian battleship Nicolai I. from the Siberian to the Mediterranean Station has restored the balance of strength in Chinese waters to the British Squadron. During the troublous times of last year the position of this squadron must have given considerable anxiety. It was barely equal in strength to the combined squadrons of France and Russia, and must have been immediately reinforced in case of war from the Pacific or Australian Stations.

Force in commission.

Some idea of the large force maintained in commission by Great Britain on distant (viz. extra-European) stations will be obtained when we state that it includes one battleship, five armoured cruisers, four first-class, ten second-class, and nine third-class protected cruisers of modern type, eleven third-class cruisers, besides some twenty-five sloops and gunboats, the Monarch, the coast-defence ships at Bombay and Melbourne, and the cruisers carrying reliefs. France has on foreign stations the old armoured cruiser Bayard, four second-class cruisers, four third-class cruisers, seven sloops or gunboats, besides two armoured gunboats and some river boats in Cochin China. The Descartes and Isly are the only ships which can be described as modern.

The table on the next page gives the effective fighting ships of our own and the principal foreign Navies, together with the ships under construction.

New classification.

Owing to the disappearance of third-class battleships from the lists of foreign Navies, and to the unsatisfactory character of a list of so-called first-class cruisers—which included several ships quite incapable of steaming more than 12 knots, as well as for other considerations—a new classification * has been attempted, which though doubtless open to objections, is at any rate better than the classification hitherto adopted, both in our own and official lists. First-class battleships are divided into sub-divisions A and B. The vessels in sub-division B, both in our own and the French Navy are certainly inferior in power to those in sub-division A, and must soon drop into

* *Cf.* Comparative Tables at end of chapter. The old classification is adhered to in the rest of the volume.—Ed.

EFFECTIVE FIGHTING SHIPS, BUILT AND BUILDING.

Class.	England.			France.			Russia.			Italy.			Germany.			United States.		
	Built.	Building.	Total.	Built.	Building.	Total.	Built.	Building.	Total.	Built.	Building.	Total.	Built.	Building.	Total.	Built.	Building.	Total.
BATTLESHIPS—																		
1st-Class	24	10	34	13	5	18	6	5	11	8	2	10	4	2	6	3	6	9
2nd-Class	7	..	7	8	1	9	5	2	7	2	..	2	4	..	4	1	..	1
3rd-Class	21	..	21	9	..	9	5	..	5	3	..	3	6	..	6	..	..	..
TOTAL BATTLESHIPS	52	10	62	31	6	36	16	7	23	13	2	15	14	2	16	4	6	10
COAST-DEFENCE SHIPS	14	..	14	16	..	16	11	4	15	..	..	..	17	2	19	19	..	19
CRUISERS—																		
Armoured	9	..	9	6	2	8	5	2	7	1	4	5	..	1	1	3	..	3
1st-Class	13	8	21	2	4	6	..	2	2	..	..	..	1	..	1	3	..	3
2nd and 3rd-Class	59	16	75	11	9	20	4	..	..	16	1	17	3	5	8	13	..	13
LOOK-OUT SHIPS	19	..	19	12	..	12	..	..	..	..	..	..	12	..	12	..	..	..
TORPEDO-GUNBOATS	34	..	34	13	2	15	8	1	9	15	2	17	9	1	10	..	..	..

the second class. From the list of second-class battleships several ships have dropped into the third-class. The Ajax and Agamemnon have been classified with coast-defence ships—mainly on account of their miserable speed. Third-class battleships have been sub-divided into A and B. In the sub-division B are now included the old battleships which have for some years been included with first-class armoured cruisers. The third-class battleships, on account of their small coal supply, low speed, muzzle-loading armament, and inferior defensive qualities, should, at any rate as far as the British Navy is concerned, be considered as Home-defence Ships—viz., as unsuitable for employment far away from their base or in company with modern ships.

Battleships.

As we have often remarked, the relative strength of Navies depends almost entirely on their relative strength in battleships. In first-class battleships our position still continues to be satisfactory. We have twenty-four ships to nineteen ships completed by France and Russia, that is, reckoning the Carnot, Charles Martel, and Jauréguiberry as ready for sea. Three additional ships of the Majestic class will be available for service during the summer. The eight vessels of the Royal Sovereign class will be generally admitted to be more powerful than the ships of any foreign Navy except the four newest French ships and the Russian Three Saints. No foreign Power possesses ships equal in fighting power to the Majestic and her eight sisters. We have laid down five ships during the past year, Germany has laid down one. During the coming year four ships are to be laid down in England, while two are reported to be in contemplation in Russia.

Of second-class battleships we have only seven completed, while France and Russia combined have twelve, and Germany has four, the Jemmapes and Valmy being included with the coast-defence ships. The Bouvines and Tréhouart are faster than anything we have in the second class. The French have laid down the Henri IV., of 9000 tons and 17-knot speed. The designs of another ship of the same type are in course of preparation. The Russians have two powerful ships of 16-knot speed on the stocks. The Sissoi Veliky, the first of the type, has been completed. Our position as regards second-class battleships is bad, and must continue to grow worse. We have under the new classification twenty-one third-class, or home defence battleships, while France and Russia have fourteen and Germany six. We are weak in coast-defence ships, but the totals of France, Russia, and Germany include a large number of armoured gunboats.

Battleships building.

Turning our attention to the future, the following is a list of the battleships building:—

ENGLAND.

Laid Down.	Name.	Displacement.
		Tons.
1895 . .	Cæsar	14,900
1894 . .	Hannibal	14,900
1895 . .	Illustrious	14,900
1894 . .	Jupiter	14,900
1894 . .	Mars	14,900
1897 . .	Albion	12,950
1897 . .	Canopus	12,950
1897 . .	Glory	12,950
1897 . .	Goliath	12,950
1897 . .	Ocean	12,950
	10 Ships.*	139,250

* 4 projected.

FRANCE.

Laid Down.	Name.	Displacement.
		Tons.
1893 . .	Bouvet	12,205
1892 . .	Masséna	11,924
1894 . .	Charlemagne	11,275
1896 . .	Gaulois	11,275
1895 . .	St. Louis	11,275
1896 . .	Henri IV.	8,948
	6 Ships.*	66,902

* 1 battleship A 3 projected.

RUSSIA.

Laid Down.	Name.	Displacement.
		Tons.
1892 . .	Petropavlosk	10,960
1892 . .	Poltava	10,960
1892 . .	Sevastopol	10,960
1895 . .	Rostislav	8,880
1896 . .	Sissoi Veliky No. 3	8,880
1895 . .	Perveuetz	12,674
1895 . .	Oslabya	12,674
	7 Ships.*	75,938

* 2 projected.

Germany is building two battleships of 11,100 tons, and has another in contemplation, and Italy two of 9800 tons.

At the end of 1897 the relative strength in completed ships will probably be—

	England.	France.	Russia.	Total France & Russia.
Battleships, 1st-class	29	15	9	24
" 2nd-class	7	8	5	13
" 3rd-class	21	9	5	14

At the end of 1898—

	England.	France.	Russia.	Total France & Russia.
Battleships, 1st-class	31	16	9	25
" 2nd-class	7	8	6	14
" 3rd-class	21	7	5	12

At the end of 1899—

	England.	France.	Russia.	Total France & Russia.
Battleships, 1st-class	34	18	11	29
" 2nd-class	7	9	7	16
" 3rd-class	19	7	5	12

The above forecasts cannot pretend to accuracy. The completion **Type.** of ships both in France and Russia will very probably be delayed beyond the years in which we have reckoned them as completed. It is apparent that in first-class battleships there is no danger of our losing our present superiority before the end of the century; but we are singularly deficient in ships of medium size and of moderate draught, and yet of sufficient speed and fighting power to enable them to deal with such ships as the Bouvines, Henri IV., and Sissoi Veliky. It would be a great waste of power to have to use a Majestic or even a Canopus to neutralise ships of this type. Their great size and draught renders them unsuitable for the purpose in narrow waters. It would therefore seem that in our new shipbuilding programme vessels of moderate displacement should be included suitable for operations in the Sound or on the French coast. They must have fighting qualities equal to those of the foreign ships which we have mentioned; but they need not have quite the same sea-keeping qualities—at any rate as regards coal endurance—as has been considered necessary, and rightly considered necessary, in our recent first-class battleships. The programme of battleship construction for 1897–98 is most satisfactory in respect to the number of ships to be laid down.

T. A. Brassey.

Comparative Tables of British, French, Russian, Italian, and German Ships.

NOTE.—*Displacements of Foreign Ships are converted into English tons.*

TABLE I.—FIRST-CLASS BATTLESHIPS.

ENGLAND.

Lnchd.	Name.	Displacement.
	B	Tons.
1886	Anson	10,600
1885	Benbow	10,600
1885	Camperdown ..	10,600
1882	Collingwood ..	9,500
1885	Howe	10,300
1884	Rodney	10,300
1893	Barfleur	10,500
1892	Centurion ..	10,500
1887	Sans Pareil ..	10,470
	A	
1888	Nile	11,940
1887	Trafalgar ..	11,940
1891	Empress of India	14,150
1891	Hood	14,150
1892	Ramillies ..	14,150
1892	Repulse	14,150
1892	Resolution ..	14,150
1892	Revenge	14,150
1892	Royal Oak ..	14,150
1891	Royal Sovereign	14,150
1895	Renown	12,350
1894	Magnificent ..	14,900
1895	Majestic	14,900
1895	Prince George	14,900
1895	Victorious ..	14,900
1896	*Cæsar*	14,900
1896	*Hannibal* ..	14,900
1896	*Illustrious* ..	14,900
1895	*Jupiter*	14,900
1896	*Mars*	14,900
	Albion	12,950
	Canopus	12,950
	Goliath	12,950
	Glory	12,950
	Ocean	12,950
	Total 34 Ships.*	

FRANCE.

Lnchd.	Name.	Displacement.
	B	Tons.
1883	Baudin	11,723
1879	Duperré	11,032
1881	Courbet	10,637
1879	Dévastation ..	10,535
1885	Formidable ..	11,972
1886	Hoche	10,823
1890	Magenta	10,680
1887	Marceau	10,679
1887	Neptune	10,810
	A	
1891	Brennus	11,215
1894	Carnot	12,008
1893	Charles Martel	11,880
1893	Jauréguiberry	11,824
1896	*Bouvet*	12,205
1895	*Charlemagne* ..	11,275
1896	*Gaulois*	11,275
1895	*Masséna*	11,924
1896	*St. Louis*	11,275
	Total 18 Ships.	

RUSSIA.

Lnchd.	Name.	Displacement.
	B	Tons.
1886	Catherine II. ..	10,180
1892	Georgi Pobiedonosetz	10,280
1891	Navarin	9,476
1887	Sinope	10,180
1886	Tchesmé	10,180
	A	
1892	Tri Sviatitelia	12,480
1894	*Petropavlovsk* ..	10,960
1894	*Poltava*	10,960
1895	*Sevastopol* ..	10,960
	Peresviet	12,674
	Oslabya	12,674
	Total 11 Ships.†	

ITALY.

Lnchd.	Name.	Displacement.
	B	Tons.
1885	Andrea Doria ..	10,826
1880	Italia	14,160
1883	Lepanto	14,173
1884	Lauria	10,826
1885	Morosini	10,826
	A	
1888	Re Umberto ..	13,087
1890	Sardegna ..	13,640
1891	Sicilia	13,087
	E. Filiberto ..	9,645
	St. Bon	9,645
	Total 10 Ships.	

GERMANY.

Lnchd.	Name.	Displacement.
	A	Tons.
1891	Brandenburg ..	9,874 (Brandenburg, Kurfürst Fried. Wilhelm, Weissenburg, Wörth)
1891	Kurfürst Fried. Wilhelm ..	
1891	Weissenburg ..	
1892	Wörth	
1896	*Kaiser Friedrich III.*	10,933 (Kaiser Friedrich III., Ersatz Friedrich der Grosse)
	Ersatz Friedrich der Grosse ..	
	Total 6 Ships.	

* 4 Projected. † 2 Projected.

Table II.—Second-Class Battleships.

England.			France.			Russia.			Italy.			Germany.		
Lnchd.	Name.	Displacement.	Lnchd.	Name.	Displacement.	Lnchd.	Name.	Displacement.	Lnchd.	Name.	Displacement.	Lnchd.	Name.	Displacement.
		Tons.			Tons.			Tons.			Tons.			Tons.
1875	Alexandra ..	9,490	1892	Bouvines ..	6,505	1887	Alexander II.	8,440	1878	Dandolo ..	11,025	1880	Baden	7,283
1882	Colossus	9,420	1885	Caiman	7,520	1890	Dvenadsat Apostoloff ..	8,076	1876	Duilio	10,962	1878	Baiern	7,283
1871	Devastation ..	9,330	1873	Friedland ..	8,852	1890	Gangoot	6,592				1877	Sachsen	7,283
1875	Dreadnought ..	10,820	1883	Indomptable ..	7,513	1889	Nicolai I. ..	8,440				1878	Württemberg..	7,283
1882	Edinburgh ..	9,420	1876	Redoutable ..	9,288	1894	Sissoi Veliky ..	8,880						
1876	Inflexible ..	11,880	1885	Requin	7,698	1896	*Rostislav*	8,880						
1872	Thunderer ..	9,330	1881	Terrible	7,455		*Sissoi Veliky No. 3*	8,880						
			1893	Tréhouart ..	6,524									
				Henri IV. ..	8,948									
Total 7 Ships.			Total 9 Ships. †			Total 7 Ships.			Total 2 Ships.			Total 4 Ships.		

* These ships are built of wood. † 1 projected.

Table III.—Third-Class Battleships.

England			France			Russia			Italy			Germany		
Lnchd.	Name.	Displacement.	Lnchd.	Name.	Displacement.	Lnchd.	Name.	Displacement.	Lnchd.	Name.	Displacement.	Lnchd.	Name.	Displacement.
		Tons.			Tons.			Tons.			Tons.			Tons.
1881	A Conqueror ..	6,200	1875	A Colbert* ..	8,783	1872	A Peter Veliky ..	8,750	1865	B Affondatore ..	3,997	1874	A Deutschland ...	7,555
1885	Hero	6,200	1873	Richelieu * ..	8,984	1873	B General Admiral	4,604	1863	Maria Pia ..	4,201	1874	Kaiser	7,555
1868	Hercules.. ..	8,680	1876	Trident * ..	8,717	1875	Gerzog Edinburgski ..	4,604	1863	San Martino ..	4,201	1884	Oldenburg ..	5,118
1868	Monarch	8,320	1880	B Bayard	5,915	1864	Kniaz Pojarski	5,007				1874	B Friedrich der Grosse* ..	6,663
1874	Neptune	9,310	1883	Duguesclin ..	6,112	1878	Minin	5,740				1868	König Wilhelm	9,603
1870	Sultan	9,290	1879	Turenne	6,249							1873	Preussen ..	6,663
1875	Superb	9,170	1882	Vauban	6,112									
1876	Téméraire ..	8,540	1870	Suffren*	7,782									
1865	B Bellerophon ..	7,550	1875	Victorieuse* ..	4,700									
1869	Audacious ..	6,010												
1869	Invincible ..	6,010												
1870	Iron Duke ..	6,010												
1870	Swiftsure.. ..	6,910												
1870	Triumph.. ..	6,640												
1863	Achilles	9,820												
1865	Agincourt ..	10,690												
1863	Minotaur ..	10,690												
1865	Northumberland	10,780												
1877	Nelson	7,630												
1878	Northampton ..	7,630												
1875	Shannon	5,390												
	Total 21 Ships.			Total 9 Ships.			Total 5 ships.			Total 3 Ships †			Total 6 Ships.	

* These ships are built of wood.

† These ships have a modern Q.-F. armament.

TABLE IV.—FIRST-CLASS CRUISERS.

ENGLAND.			FRANCE.			RUSSIA.			ITALY.			GERMANY.		
Speed.	Name.	Displacement.	Speed.	Name.	Displacement.	Speed.	Name.	Displacement.	Speed.	Name.	Displacement.	Speed.	Name.	Displacement.
Knots.		Tons.	Knots.		Tons.	Knots.		Tons.	Knots.		Tons.	Knots.		Tons.
16½	Impérieuse	8,400	19	Bruix	4,679	16½	Admiral Nachimoff	7,782	19	Marco Polo ..	4,527	21	Kaiserin Augusta ..	6,956
16½	Warspite	8,400	19	Chanzy	4,855	15½	Dmitri Donskoi	5,893	20	*Carlo Alberto* ..	6,396	19	*Ersatz Leipzig* .	10,482
18	Aurora	5,600	19	Charner	4,716	18	Pamyat Azova.	6,000	20	*G. Garibaldi* ..	6,732			
18	Australia ..	5,600	19	Latouche Tréville	4,681	18	Rurik	10,923	20	*Varese*	6,732			
18	Galatea	5,600	20	Dupuy de Lôme	6,305	17	Vladimir Monomach	5,796	20	*Vettor Pisani* ..	6,396			
18	Immortalité ..	5,600	19	Pothuau	5,275	20	*Rossia*	12,130						
18	Narcissus ..	5,600	19	Cecille	5,839	20	*Diana*	6,630						
18	Orlando	5,600	19	Tage	7,469	20	*Pallada*	6,630						
18	Undaunted ..	5,600	19	*D'Entrecasteaux*	8,114		*Rossia No. 2* ..	14,000						
21½	Blake	9,000	23	*Jeanne d'Arc* ..	11,092									
21½	Blenheim ..	9,000	23	*Chateau Renault*	7,890									
19¾	Crescent	7,700	23	*Guichen*	8,146									
20	Edgar	7,350	23	*Jurien de la Gravière* ..	5,413									
20	Endymion ..	7,350	23	*C 3*	11,092									
19¾	Gibraltar ..	7,700												
20	Grafton	7,350												
20	Hawke	7,350												
19¾	Royal Arthur ..	7,700												
19¾	St. George ..	7,700												
20	Theseus	7,350												
22	Powerful	14,200												
22	Terrible	14,200												
20½	*Andromeda* ..	11,000												
20½	*Diadem*	11,000												
20½	*Europa*	11,000												
20½	*Niobe*	11,000												
20¾	*Amphitrite* ..	11,000												
20¾	*Argonaut*	11,000												
20¾	*Ariadne*	11,000												
20¾	*Spartiate*	11,000												
	Total 30 Ships.			Total 14 Ships.			Total 9 Ships.			Total 5 Ships.*			Total 2 Ships.	

* 1 projected of 10,000 tons.

TABLE V.—SECOND AND THIRD-CLASS CRUISERS.

ENGLAND.

Speed.	Name.	Displacement.
Knots.		Tons.
19¾	Æolus	3,600
17	Amphion ..	4,300
20	Andromache ..	3,400
20	Apollo	3,400
17	Arethusa	4,300
19½	Astræa	4,360
19½	Bonaventure ..	4,360
19¾	Brilliant ..	3,600
19½	Cambrian ..	4,360
19½	Charybdis ..	4,360
19½	Flora	4,360
19½	Forte	4,360
17	Forth	4,050
19½	Fox	4,360
19½	Hermione ..	4,360
19¾	Indefatigable ..	3,600
19¾	Intrepid	3,600
19¾	Iphigenia ..	3,600
19	Katoomba ..	2,575
20	Latona	3,400
17	Leander	4,300
19	Magicienne ..	2,950
19	Marathon ..	2,950
19	Medea	2,800
19	Medusa	2,800
20	Melampus ..	3,400
19	Melpomene ..	2,950
17	Mersey	4,050
19	Mildura	2,575
20	Naiad	3,400
19	Pallas	2,575
19	Pearl	2,575
17	Phaeton	4,300
19	Philomel	2,575

FRANCE.

Speed.	Name.	Displacement.
Knots.		Tons.
19½	Alger	4,313
19¼	Bugeaud ..	3,681
19¼	Chasseloup-Laubat ..	3,699
20	Davout	2,979
19¼	Friant	3,680
19	Isly	4,406
19	Jean Bart ..	4,044
20	Linois	2,308
19¼	Pascal	3,925
17	Sfax	4,561
20	Suchet	3,281
19	*Catinat*	4,011
19	*Cassard*	3,890
19	*D'Assas*	3,890
19	*Descartes*	3,925
19	*Duchayla* ..	3,890
19	*Protet*	4,048
20	*Galilée*	2,280
20	*Lavoisier*	2,280
20½	*Infernet*	2,413

RUSSIA.

Speed.	Name.	Displacement.
Knots.		Tons.
17½	Admiral Korniloff	5,000
15½	Pamyat Merkuriya	3,050
15	Rynda	2,950
20	*Svietlana*	3,828

ITALY.

Speed.	Name.	Displacement.
Knots.		Tons.
19	Calabria	2,470
19½	Dogali	2,017
18	Elba	2,690
18	Etna	3,474
19	Etruria	2,245
17½	Fieramosca ..	3,542
17½	Giovanni-Bausan ..	2,922
18	Liguria	2,245
17	Lombardia ..	2,245
21	Piemonte ..	2,460
17	Stromboli ..	3,420
19	Umbria	2,245
17	Vesuvio	2,373
20	*Puglia*	2,550

GERMANY.

Speed.	Name.	Displacement.
Knots.		Tons.
20	Gefion	4,044
20	Irene	4,330
19	Prinzess Wilhelm	4,330
21	*Ersatz Freya* ..	5,561
21	*K*	5,561
21	*L*	5,561
21	*M*	5,561
21	*N*	5,561

19¾	Pique	3,600				
19¾	Rainbow ..	3,600				
19¾	Retribution ..	3,600				
19	Ringarooma ..	2,575				
20	Sappho	3,400				
20	Scylla	3,400				
17	Severn	4,050				
19¾	Sirius	3,600				
19¾	Spartan	3,600				
20	Sybille	3,400				
19	Tauranga ..	2,575				
20	Terpsichore ..	3,400				
17	Thames	4,050				
20	Thetis	3,400				
20	Tribune	3,400				
19	Wallaroo.. ..	2,575				
19½	Diana	5,600				
19½	*Dido*	5,600				
19½	Doris	5,600				
19½	Eclipse	5,600				
19½	*Isis*	5,600				
19½	Juno	5,600				
19½	Minerva	5,600				
19½	Talbot	5,600				
19½	Venus	5,600				
19	*Arrogant*	5,800				
19	*Furious*	5,800				
19	*Gladiator* ..	5,800				
19	*Vindictive* ..	5,800				
20	*Hermes*	5,600				
20	*Highflyer* ..	5,600				
20	*Hyacinth*	5,600				
20½	Pelorus	2,135				
20	*Proserpine* ..	2,135				
20	*Pactolus*	2,135				
20	*Pegasus*	2,135				
20	*Perseus*	2,135				
20	*Pomone*	2,135				
20	*Prometheus* ..	2,135				
20	*Pyramus*	2,135				
	Total 75 Ships.		Total 20 Ships.	Total 4 Ships.	Total 14 Ships.	Total 8 Ships.†

† 2 projected.

Table VI.—Coast Defence Ships.

ENGLAND.			FRANCE.			RUSSIA.			ITALY.			GERMANY.		
Lnchd.	Name.	Displacement.	Lnchd.	Name.	Displacement.	Lnchd.	Name.	Displacement.	Lnchd.	Name.	Displacement.	Lnchd.	Name.	Displacement.
		Tons.			Tons.			Tons.						Tons.
1879	Agamemnon ..	8,660	1885	Achéron	1,693	1868	Adm. Chicagoff	3,511	Nil.	Nil.	Nil.	1878	Basilisk	1,091
1880	Ajax	8,660	1887	Cocyte	1,688	1868	Adm. Greig ..	3,593				1890	Beowulf	3,440
1870	Abyssinia * ..	2,900	1885	Flamme	1,107	1867	Adm. Lazareff	3,556				1876	Biene	1,091
1876	Belleisle	4,870	1877	Fulminant ..	5,871	1868	Adm. Spiridoff	3,500				1878	Camaleon ..	1,091
1870	Cerberus† ..	3,480	1883	Furieux	5,925	1867	Charodeika ..	2,026				1879	Crocodil	1,091
1871	Cyclops	3,560	1884	Fusée	1,122	1892	Gremyastchy ..	1,500				1891	Frithjof	3,440
1871	Glatton	4,910	1888	Grenade	1,073	1890	Grosjastchy ..	1,492				1893	Hagen	3,440
1871	Gorgon	3,560	1892	Jemmapes ..	6,485	1873	Novgorod ..	2,706				1892	Heimdall.. ..	3,440
1871	Hecate	3,560	1886	Mitraille ..	1,112	1892	Otvazny	1,500				1892	Hildebrand ..	3,440
1870	Hotspur	4,010	1892	Phlégéton ..	1,767	1875	Popoff	3,590				1881	Hummel	1,091
1871	Hydra	3,560	1892	Styx (c)	1,767	1894	Adm. Senjavin	4,126				1887	Mücke	1,091
1870	Magdala* ..	3,340	1876	Tempête	4,793	1893	Adm. Oushakoff	4,126				1880	Natter	1,091
1879	Orion (a)	4,870	1880	Tonnant	5,010	1896	*Gen. Adm. Apraxine* ..	4,126				1894	Odin	3,503
1872	Rupert (b) ..	5,440	1875	Tonnerre	5,765	1895	*Khrabry*	1,492				1880	Salamander ..	1,091
			1892	Valmy	6,485		*Unnamed* ..	4,126				1877	Skorpion	1,091
			1878	Vengeur	4,635							1889	Siegfried.. ..	3,440
												1876	Viper	1,091
												1876	Vespe	1,091
												1895	*Aegir*	3,503
Total 14 Ships.			Total 15 Ships.			Total 15 Ships.‡						Total 19 Ships.		

* Indian Marine. † Victorian Marine.
‡ Kreml, Pervenetz and Netron Menya, which are over 30 years old, omitted.

(a) At Malta. (b) At Gibraltar. (c) At Saigon.

TABLE VII.—LOOK-OUT SHIPS.

ENGLAND.			FRANCE.			RUSSIA.			ITALY.			GERMANY.		
Speed.	Name.	Displacement.	Speed.	Name.	Displacement.	Speed.	Name.	Displacement.	Speed.	Name.	Displacement.	Speed.	Name.	Displacement.
Knots.		Tons.	Knots.		Tons.	Knots.		Tons.	Knots.		Tons.	Knots.		Tons.
17	Alacrity	1,700	19¼	Coëtlogon ..	1,901							16	Blitz	1,360
16½	Archer	1,700	17¾	Condor	1,220	Nil.	Nil.	Nil.	Nil.	Nil.	Nil.	16½	Buzzard	1,827
17¾	Barham	1,830	20½	Cosmao	1,923							16	Condor	1,614
16¾	Barracouta ..	1,500	17	Epervier	1,268							16	Cormoran ..	1,614
16¾	Barrosa	1,580	17½	Faucon	1,220							15½	Falke	1,703
17¾	Bellona	1,830	18	Fleurus	1,289							16	Geier	1,614
16¾	Blanche	1,580	20½	Forbin	1,791							23	Greif	1,471
16¾	Blonde	1,580	20½	Lalande	1,895							19	Jagd	1,230
16½	Brisk	1,770	20½	Surcouf	2,012							16	Pfeil	1,360
16½	Cossack	1,770	20½	Troude	1,994							16	See-Adler ..	1,614
16¾	Fearless	1,580	17½	Vautour	1,220							19	Wacht	1,230
18	Iris	3,730	18½	Wattignies ..	1,272							23	*Hela*	1,971
18	Mercury	3,730												
16½	Mohawk	1,770												
16½	Porpoise	1,770												
17½	Racoon	1,770												
16¾	Scout	1,580												
17	Surprise	1,700												
16½	Tartar	1,770												
Total 19 Ships.			Total 12 Ships.									Total 12 Ships.		

Table VIII.—Torpedo Gunboats.

England.			France.			Russia.			Italy.			Germany.		
Speed.	Name.	Displacement.	Speed.	Name.	Displacement.	Speed.	Name.	Displacement.	Speed.	Name.	Displacement.	Speed.	Name.	Displacement.
Knots.		Tons.	Knots.		Tons.	Knots.		Tons.	Knots.		Tons.	Knots.		Tons.
19	Alarm	810	18½	Bombe	413	20	Captain Sacken	700	20	Aretusa	833	22½	Komet	931
19	Antelope	810	21½	Casabianca	945	22	Gaidamak	500	20	Calatafimi	833	21	Meteor	931
20	Assaye	735	21½	Cassini	943	22	Griden	400	21	Caprera	833	26	2 Division Boats	380
20	Boomerang	735	18	Couleuvrine	428	21	Kazarsky	411	17	Confienza	768	26	2 "	350
19	Circe	810	18	Dague	402	20	Lieutenant Ilyn	600	20	Euridice	833	22	2 "	320
19	Dryad	1,070	21½	D'Iberville	952	22	Posadnik	400	20	Folgore	370	21	2 "	300
20	Gleaner	735	18	Dragonne	403	22	Voevada	400	19	Goito	812			
19	Gossamer	735	18	Flèche	418	22	Vzadnik	500	19½	Iride	833			
19	Grasshopper	525	18	Lance	395				19	Minerva	833			
19	Halcyon	1,070	18¾	Léger	509				19	Montebello	814			
19	Harrier	1,070	18½	Lévrier	497				19	Monzambano	840			
19	Hazard	1,070	18	Sainte-Barbe	430				19	Partenope	833			
19	Hebe	810	18	Salve	406				20	Saetta	400			
19	Hussar	1,070	23	*Dunois*	882				18	Tripoli	848			
19	Jaseur	810	23	*La Hire*	882				20	Urania	833			
20	Jason	810	26	*M*	369				22	*Agordat*	1,292			
20	Karrakatta	735							26	*Coatit*	1,292			
19	Leda	810												
19	Niger	810												
19	Onyx	810												
20	Plassy	734												
18	Polyphemus	2,640												
18½	Rattlesnake	550												
19	Renard	810												
20	Salamander	735												
19	Sandfly	525												
20	Seagull	735												
20	Sharpshooter	735												
20	Sheldrake	735												
20	Skipjack	735												
20	Spanker	735												
20	Speedwell	735												
20¼	Speedy	810												
19	Spider	525												
Total 34 Ships.			Total 16 Ships.*			Total 8 Ships.			Total 17 Ships.			Total 10 Ships.†		

* 1 projected. † 1 projected.

COMPARATIVE STATEMENT SHOWING EXPENDITURE ON CONSTRUCTION OF NEW VESSELS, HULLS AND MACHINERY, IN ENGLAND AND FRANCE, FROM 1869–70 TO 1897–98.

Year.	England.	France.
	£	£
1869–70	1,387,047	655,016
1870–71	1,330,814	411,948
1871–72	1,184,172	429,832
1872–73	809,087	614,460
1873–74	1,290,028	789,684
1874–75	1,528,161	921,380
1875–76	1,613,218	1,054,560
1876–77	2,121,960	1,301,988
1877–78	2,922,442	1,501,884
1878–79	1,508,049	1,504,656
1879–80	1,388,607	1,375,296
1880–81	1,426,349	1,345,084
1881–82	1,682,500	1,400,152

Year.	England.	France.
	£	£
1882–83	1,767,014	1,559,644
1883–84	1,930,090	1,536,508
1884–85	2,242,070	1,510,704
1885–86	3,737,000	1,355,684
1886–87	3,495,000	1,280,000
1887–88	2,819,537	2,510,020
1888–89	2,398,805 *190,842	1,848,930
1889–90	2,455,997 †984,314 3,440,311	1,759,684
1890–91	2,769,651 †2,656,695 5,426,346	2,396,000

Year.	England.	France.
	£	£
1891–92	3,026,449 †2,653,670 5,680,119	2,800,000
1892–93	2,498,213 †1,788,695 4,286,908	2,800,000
1893–94	980,319 †2,244,106 3,224,425	2,918,120
1894–95	4,201,755	3,049,720
1895–96	6,301,755	3,033,400
1896–97	7,765,646	3,111,640
1897–98 (Estimates)	7,166,191	2,902,758

* Expenditure on ships building under the Imperial Defence Act of 1888. † Provided for under Naval Defence Act.

NOTE.—French Expenditure in this statement is sum of votes 16, 27, 28, in Navy Estimates.

CHAPTER IV.

The German Navy.

When in 1848 the Danish Fleet, with a few small vessels, successfully blockaded the German ports, all Germany rang with the cry for a Navy which would command respect. The requirements then formulated with regard to a fleet were :—

(1) That it should be capable of preventing a blockade of the ports in future;
(2) That it should keep the home waters free from enemies; and
(3) That it should be capable of protecting the interests of the country across the sea.

The organisation of the Prussian Navy, which was created on these lines and slowly increased, was evolved after the pattern of other Navies while adopting as far as practicable the well-tried institutions of the Army.

Central Organisation.

In the constitution of the Federal State of the German Empire, established in January, 1871, it is provided that:—" The Navy of the Empire shall be a joint Navy (*i.e.*, Imperial without any national distinction as regards the individual Federal States) under the supreme command of the Emperor; its organisation and composition shall be left to the Emperor, who shall appoint the officers and officials of the Navy, and to whom both these and the men are to be sworn." Hence His Majesty is the Chief of the Navy. Quite apart from other matters, the active interest taken by His Majesty the Emperor in all Naval matters is apparent from his frequent presence in the Naval ports and with the fleet. All questions concerning organisation, ship-building, introduction of new arms, and all progress and improvements in technical matters, as well as with regard to proposed appointments to superior offices, are brought before His Majesty for decision.

The executive organ for the Emperor's commands is the " Naval Cabinet," at the head of which is an Admiral of the Emperor's

suite, or a Naval captain and aide-de-camp to His Majesty. The "Naval Cabinet" deals chiefly with such matters concerning officers as are reserved for the Emperor's decision. For instance, all appointments, promotions, etc., of officers of the rank of a captain and upwards are issued to the parties concerned direct from the "Naval Cabinet." Since 1889 the "command" (combatant) branch and the administrative branch of the Navy have been made separate departments. The two central authorities, viz., "Reichs-Marine-Amt," the civil and administrative branch, and the "Oberkommando," Commander-in-Chief's office, have their headquarters in Berlin. The former has at its head the Naval Secretary of State, who is an Admiral, and is the chief imperial authority for the administration as well as for the organisation of the Navy. The latter is the office of the Admiral Commanding-in-Chief, who, under the Emperor, controls all the Naval forces and vessels.

The Naval Secretary of State.

There is no German Minister of Marine, as the German Empire has no Minister. On this point the constitution of the Empire provides that "the administration and supervision of such matters as have been placed by the Federal States under the control of the Imperial Government shall be entrusted to the Imperial Chancellor. The chiefs of the various 'Imperial Departments' shall be subordinate to him." Another Act confers on the Secretaries of State the charge of the administration of their respective Departments, in the capacity of representatives of the Imperial Chancellor, and thus, among the number, the Naval Secretary of State is entrusted with the administration of the Navy. The Naval Secretary of State is deputed to represent the Navy both in the Federal Council and in the Reichstag. All matters concerning the regulation, maintenance and increase of the Navy are dealt with by him. Orders and regulations are issued by the Emperor and countersigned by the Imperial Chancellor or his representative in Naval matters, viz., the Naval Secretary of State.

The duties of the "Reichs-Marine-Amt" at Berlin are distributed among a number of Branches, viz., the "Central Branch," the "Military Branch," the "Controllers' Department," the "Ordnance Branch," and the "Hydrographical Branch," under the management of Naval officers, the "Construction Branch" and the "Accountant Department," under the control of a superior civil official, and finally the "Medical" and "Intelligence" Departments.

The "Central Abtheilung" (Central Branch) supervises the conduct of business in the various departments, and deals with matters of a more general nature.

The "Militarische Abtheilung" (Military Branch) has to study

the military aspect of questions in connection with the provision and maintenance of the *matériel* of the fleet, as well as the organisation of the Navy, the commissioning of the vessels, and the service on board and ashore.

The "Marine" (Controllers') Department has charge of the working and administration of the dockyards, the keeping in readiness of the vessels, and matters connected with torpedoes.

The "Waffen Abtheilung" (Ordnance Branch) examines, procures and administers the artillery, mining and blockading *matériel* for ships and coast-defences.

The "Constructions-Abtheilung" (Chief Constructor's Department) prepares the designs and has charge of the construction of new vessels and their machinery.

The "Hydrographical Branch" is responsible for surveys, Naval charts and nautical instruments and apparatus, and for the collection and distribution of hydrographic information.

The "Verwaltungs" (Accountant Generals') Department is more especially responsible for the preparation of the statements relating to the financial requirements of the Navy to be submitted to the legislative bodies of the Empire, and has control of the administration of all Naval expenditure.

The "Medizinal-Abtheilung" (Medical Department) has charge of all matters appertaining to the medical service. This section is under the management of the Surgeon-General (Generalarzt) of the Navy, who is the chief of the Medical Corps, *i.e.*, the medical Director-General of the Navy.

The "Intelligence Department" is responsible for the collection of all Naval intelligence.

The Commanding Admiral.

In military matters the mouthpiece of His Majesty the Emperor is the Admiral Commanding-in-Chief, who is at the head of the Commander-in-Chief's Office. In particular, it is his duty to see that all the officers under him possess the knowledge and abilities required for the exercise of their special functions, and that they only retain their position in the service as long as they are efficient for active service. He has control of the appointments and reliefs of the military *personnel*. He selects and submits to His Majesty exhaustive reports as to the results of inspections of *personnel* and vessels, as well as with reference to the services the latter are performing on foreign stations. Once a year the Admiral Commanding-in-Chief inspects the Technical Institutions, which are under the control of the Naval Secretary of State, such as, for instance, the Dockyards, and reports to the Emperor how far, in his opinion, they would be able to meet the requirements of actual warfare.

At the Commander-in-Chief's office in Berlin, a Rear-Admiral, as chief of the staff, conducts the whole business management of affairs. He distributes the work to the various sections for "*Personnel*," "Training and Education," "Employment of Vessels on Political Service," "Working out Plans of Operations and Studies of Foreign Navies," "Matters affecting Organisation," and "Mobilisation." All these sections are presided over by Naval officers on the staff of the Commander-in-Chief's Office.

Vessels in Commission.

Out of the eighty-eight men-of-war—to be discussed more fully under the head of *Matériel*—there are at present (viz., in the winter of 1896–97) forty-two in commission, of which twenty-five are stationed at home and seventeen in foreign waters. There are the following divisions, viz.:—The Home Battleship and Cruiser Fleet, intended for purposes of practice and training, the Cruiser Division engaged on foreign service, the detached vessels on foreign stations, and also vessels for other purposes, such as surveying, fishery protection in the North Sea, Imperial yachts, and finally vessels which are going through their trials. Vessels commissioned for steam trials, surveys or experiments of any kind are, as regards these matters, under the authority of the Administrative Branch, and in military respects under the Commander-in-Chief. The first squadron forms the nucleus of the home battle fleet. This consists of two divisions of four iron-clads each. The Admiral in command of the squadron is at the same time the Admiral of the first division. His staff consists of a captain, as chief of the staff; a commander, as Admiral's staff officer; a lieutenant, as gunnery officer; a flag lieutenant, a signalling officer, an engineer, a deputy judge advocate, a medical officer, a paymaster, and a chaplain. The second division, which is at present under the command of H.R.H. Prince Henry of Prussia, has only a flag lieutenant, signalling officer, engineer, medical officer, and paymaster on its staff. In 1897 the squadron will consist of the first-class battleships Kurfürst Friedrich Wilhelm, Brandenburg, Weissenburg, and Worth; the third-class battleships * Sachsen and Wurttemberg, the first-class cruiser König Wilhelm, and the despatch vessels Wacht and Jagd. This squadron remains in commission all the year round. In winter, as far as the condition of the ice will permit, the divisions will make cruises in home waters, in order to give training to the recruits. In spring the vessels are inspected individually by the

The first squadron.

* German classification.

Admiral-in-Command, when as a rule the Admiral Commanding-in-Chief is present. This is followed by divisional and squadron exercises until the grand manœuvres of the Fleet commence. The *personnel* of the first squadron numbers 157 officers, 11 officials, and 3839 men.

The Reserve Divisions.

The German Navy has, further, three reserve divisions of four battleships each, of the type specially built during the last decade for the protection of the Kaiser-Wilhelm (Baltic) Canal, including four old-type armoured gunboats. The Reserve Division of the German Ocean is stationed at the Naval port of Wilhelmshaven. Two depôt vessels of this division are continually in commission; at the present moment these are the fourth-class battleships Frithjof and Siegfried. The depôt ship of the Baltic Reserve Division is the fourth-class battleship Hagen, stationed at the Naval port of Kiel. In addition to these there is a Naval Reserve Division at Danzig, the depôt vessel of which is the armoured gunboat Mucke, stationed at Danzig. In summer, as large a number of vessels are commissioned in the Reserve Division as the funds annually voted for this purpose will permit. For the autumn manœuvres, as a rule, one mixed division only is formed from the vessels belonging to the Reserve Divisions of the Baltic and the North Sea.

Training-vessels.

For training midshipmen, Naval cadets, and boys, there are four old-fashioned fully-rigged cruiser-frigates—the Stosch, Stein, Gneisenau, and Moltke. On board the Stosch and Stein, the training of all the three groups takes place, while the Gneisenau and Moltke have midshipmen and boys only on board. In the autumn these vessels make a voyage to the Mediterranean or the West Indies, returning early in April. After being repaired in the dockyard they receive at the end of April a fresh draft of midshipmen and boys. The old midshipmen and Naval cadets meanwhile go through the prescribed examinations under the Educational Inspection Department, after passing which, the Naval cadets re-embark as midshipmen, while the older midshipmen are transferred to the gunnery or torpedo-school ships. The training-ships also take part in the autumn manœuvres of the fleet. Two gunnery-ships and one torpedo and submarine mining training-ship serve for training officers and men in these branches of the service respectively.

The torpedo-boat flotilla.

Throughout the year three "Torpedo-boat Divisions of the Reserve" are formed in Wilhelmshaven and an equal number in Kiel. Each division consists of one "Torpedo-division Boat," which is permanently commissioned as a depôt boat, and eight torpedo-boats. Moreover, at each station there are two torpedo instructional-boats, commissioned throughout the year, for training the *personnel*. In

the autumn, up to about the middle of December, a torpedo-boat division is kept fitted out at Kiel and another at Wilhelmshaven, under the designation of "Torpedo-boat Flotilla." In the early part of April this flotilla continues its practice, and finishes up with the autumn manœuvres. For these latter, a second flotilla is formed for a period of about three months.

The second-class cruiser Kaiserin Augusta and the third-class cruiser Gefion are stationed as guardships at Kiel and Wilhelmshaven respectively. During winter and spring they serve at the same time for training the newly joined stokers and artificers. During the manœuvres these cruisers do reconnoitring service for the manœuvre fleet. The guard-ships.

From the vessels composing the "Home Battleship and Cruiser Fleet," a squadron, under the personal command of the Admiral Commanding-in-Chief, is formed every year, from the commencement of August up to the middle of September, for the execution of manœuvres. To this squadron all available vessels are attached. The Naval officers serving in the Commander-in-Chief's office form the staff and embark on the vessels destined to serve as flag-ships. A second squadron, of two divisions each, is formed out of the training-ships and vessels of the two reserve divisions of the Baltic and North Sea, the commanders of this squadron and its divisions being specially appointed by His Majesty the Emperor for the term of the manœuvres. In August, 1896, the whole manœuvre fleet, consisting of four first-class, three second and third-class, and four fourth-class battleships, four training-ships, two second and third-class cruisers, six despatch-boats, and two torpedo-boat flotillas, for the first time passed in succession through the Kaiser Wilhelm (Baltic) Canal within twenty-four hours, according to programme. The manœuvre fleet.

There is on foreign service a "Cruiser Division," consisting at present of the second-class battleship Kaiser, the second-class cruisers Prinzess Wilhelm and Irene, and the third-class cruiser Arcona. The officer in command of the division is a Rear-Admiral, his staff includes a flag-lieutenant, an engineer, medical officer, deputy judge advocate, paymaster and chaplain. This Cruiser Division is at present stationed in the waters of Eastern Asia, but if circumstances required could be sent elsewhere. The cruiser division.

There are seven foreign stations on which there are at present the following vessels:—

East Asia: fourth-class cruiser Kormoran.

Australia: fourth-class cruisers Bussard and Falke, surveying vessel Mowe.

East Africa: fourth-class cruisers Kondor and Seeadler.
West Africa: gunboats Habicht and Hyane.
Mediterranean: training-ships Stosch, Stein, Gneisenau, Moltke, and the Loreley, station vessel for the German Ambassador in Constantinople.

In America there are no German men-of-war, but in the Estimates for 1897–98 a credit is demanded for sending a ship to this station.

At the various stations the senior commanding officer acts as "Senior Officer of the Station." He controls the employment of the vessels at the station, and it is also incumbent on him to inspect the vessels once every year. The crews of the vessels on foreign stations are as a rule relieved after two years, except those on the West African station who are relieved annually.

Vessels not in commission.

The vessels which are not commissioned and which are in the dockyards either in reserve, or for repairs or alterations, are classified according to their seagoing or fighting efficiency as follows:—

A. "Vessels of the First Reserve," which always have the pennant flying and a reduced crew on board, and are supposed to be ready for service within five or six days.
B. "Vessels of the Second Reserve," which would be ready for commission after completing repairs, etc.
C. "Vessels of the Third Reserve," which would not be available for service for some time to come, owing to important alterations or repairs to be carried out.

As the maintenance of vessels in the A division of the Reserve is too expensive, hardly any vessels are at present in this category of the reserve, while on the other hand the time during which vessels requiring repairs have to remain in the "Third Reserve" is reduced to a minimum. The authorities endeavour, as far as possible, to keep all vessels not in commission in the Second Reserve, that is to say, in readiness for immediate equipment. The station headquarters or depôts provide the crews for the ships put into commission, commanders and officers being already appointed.

Naval Authorities Ashore.

A distinction must here be made between the executive functions of the Admiral Commanding-in-Chief and the technical and administrative duties of the Naval Secretary of State. The Dockyards are subordinate to the latter.

Matters under the control of the Admiral Commanding-in-Chief.

To each of the two Naval ports of Kiel and Wilhelmshaven a Vice-Admiral is appointed as "Marine Stationschef" (Commander-in-Chief of the Station) for the Baltic and for the North Sea respectively. These Admirals are also in command of the Naval port district, including the forts. All the vessels, dockyards, and Naval resources within the jurisdiction of the station are under their authority, excepting the vessels of the "First Squadron." A flag captain manages the very extensive business of the station. Besides him, there are on the staff of the Commander-in-Chief of the Station a lieutenant as Admiral's staff officer, a lieutenant, and a lieutenant of the Marine Infantry as adjutants, a staff engineer, a staff surgeon, a storekeeping and accountant officer ("Intendant"), two deputy judge advocates, two Protestant and one Roman Catholic Naval chaplains, and finally four retired Naval captains or "corvette-captains" (zur Disposition*), who manage certain branches of business. One of the latter is "port captain" of the Naval port.

The duties of the Commander-in-Chief of the Station comprise, in addition to the entire business of the recruiting depôt—

(1) Personal matters concerning the officers belonging to the station.
(2) Discipline and matters of military law, with reference to the whole "military" *personnel* belonging to the station.
(3) Relief and appointment of crews.
(4) Leave of officers and men.
(5) Discharge of men.
(6) Invaliding; provision for families of men who died on service.
(7) Matters concerning the Naval port.
(8) Matters connected with mobilisation.

At each of the station headquarters there is a Seamen's and a Dockyard Division, under the control of a Rear-Admiral, as "Marine Inspector"; the guard-ship and the depôt ship of the Reserve Division for the Baltic and the North Sea being in each case under the command of this officer. The Seamen's Division is a depôt for Naval *personnel*, viz., petty officers, quartermasters, signalmen, gunners, masters-at-arms, storekeepers and their mates, and seamen. The Shipyard Division is a depôt for the non-combatant *personnel*, such as engine-room artificers, leading stokers and their mates, "greasers," stokers, paymasters, candidates for employment, and apprentices, storehousemen and their mates, hospital assistants, armourers, bakers, writers, carpenters, painters, coopers, bootmakers,

* Retired officers who have given up their claims to promotion, and have taken service again in fixed appointments.

and tailors. Both depôts have at their head Naval captains, under whose supervision two corvette-captains act as commanders of the seamen's subdivisions, and six captain-lieutenants in one case and four in the other as company-captains. In these depôts the recruits are entered and partly obtain their first military training, and from these they are discharged again after the completion of their term of service. A record is kept here concerning each man during his term of active service, which in the case of ordinary men lasts three years and over. In accordance with a scheme issued by the "Reichs-Marine-Amt," and with the funds voted in the estimates, crews are selected for ships specified according to the service in which they will be employed, for instance, relief for a station vessel in East Africa. Careful attention to their duties on the part of company and sub-divisional officers is of great importance to the efficiency of the Fleet.

Inspector of marine artillery.

The Inspector of Marine Artillery, as a rule a Rear-Admiral, supervises the training of the gunnery ships, as well as the formation of a competent staff of gunners and the training of the artillery divisions. The duty of the four artillery divisions is to work the guns and attend to the blockading *matériel* of the defended ports occupied by the Navy, including Heligoland, Friedrichsdort, Cuxhaven, Bremerhaven, and Wilhelmshaven. Each Marine Artillery Division is commanded by a commander as commanding officer, and has from two to four companies commanded by lieutenants.

Inspector of torpedoes.

"The Inspector of Torpedoes," a Rear-Admiral, has charge of all matters, technical or otherwise, connected with torpedoes. He is responsible for the proper performance of all duties in connection with torpedo-boat flotillas, torpedo experiments, torpedo training-ships, torpedo shops, and for the efficiency of the torpedo *personnel* generally. The First Torpedo Division is stationed at Kiel, and the Second at Wilhelmshaven. They supply the crews for torpedo-boats, and the staff for attending to the torpedo-fittings and explosive material on board of other men-of-war. Each division is in charge of a corvette-captain, and is divided into three companies, each of which is in charge of a captain-lieutenant.

Inspector of marine infantry.

"The Inspector of Marine Infantry," a colonel, is entrusted with the supervision of the two marine battalions, of which the first is stationed at Kiel, and the second at Wilhelmshaven, being chiefly used for watch-keeping, sentry, and guard duties, and for acting as guards of honour in the Naval ports; the officers of these two battalions are drawn from the Army.

Each man is trained—as an essential means for establishing discipline—in Infantry duties, in shooting with rifle and revolver, and

in gymnastics. He is required to have a military bearing, to know his superiors, and to have received as good a preliminary training as possible for his special service. It is a recognised rule that all superiors shall allow suitable liberty to their subordinates in the service, and only supervise them without interfering further than any fault or neglect may render necessary.

Duties of the Naval Secretary of State.

In technical and administrative matters the Naval Secretary of State may communicate direct with the various executive organs of the Admiral Commanding-in-Chief, with the Commanders-in-Chief of the stations, with the Admirals commanding squadrons, and with the captains of detached vessels stationed abroad. The Secretary of State, however, has particular control of a series of administrative departments. These include the dockyards and the Commissariat and Accountant Branches, with which we shall presently deal more fully, the Military Stores Department, with the Ordnance and Mine Depôts appertaining to it, and finally, the torpedo workshops at Friedrichsort for the construction and maintenance of torpedoes.

All lights, buoys, and marks for navigation on the German coast are under Imperial control, *i.e.*, under the Administrative Department of the Navy; while the local administration devolves on the respective Governments of the Federal States. For this purpose six "Coast District Stations" are arranged—at Neufahrwasser, Stettin, and Kiel, for the Baltic; and at Husum, Bremerhaven, and Wilhelmshaven, for the German ocean, each district having at its head a Naval captain (zur Disposition).

A Rear-Admiral (zur Disposition) is appointed as "Imperial Commissary," to represent the interests of the Navy, on the Board of the Kaiser Wilhelm Canal. He, too, is subordinate to the Naval Secretary of State.

The "Ships Examining Commission" at Kiel is responsible for the trials of ships, more especially of new ships, and for the testing of the efficiency of their fittings. At its head is a senior captain or Rear-Admiral.

The Naval hospitals at the five Naval stations, of which there are four in Germany, at Kiel, Friedrichsdort, Bremerhaven and Cuxhaven, and one at Yokohama in Japan, have at their head a medical officer of the rank of "Oberstabsarzt" (chief staff surgeon or surgeon-major). They serve as infirmaries for sick men, and for training the ambulance staff, and keep in readiness the equipment for ships' hospitals.

The Meteorological Office is intended to promote and assist the German shipping trade, for instance, by storm warnings along the German coast. For this purpose it maintains a large number of recording stations and signalling stations along the coast. The

examination of nautical instruments, the fitting of compasses on board of merchantmen, etc., are also among its duties. As the work of the Meteorological Office is of such great importance to the Mercantile Marine it is located at Hamburg, the chief commercial port of the German Empire.

The Imperial dockyards.

The German Navy has three dockyards—at Wilhelmshaven, Kiel and Danzig. The last named is of minor importance, at least as a fitting-out yard. The dockyard superintendent (Oberwerst Director) is a Rear-Admiral or captain, and is directly subordinate to the Secretary of State. Under the supervision of the superintendent there are the following heads of departments:—The outfitting director (captain of the Fleet Reserve), the director of ordnance, the director of torpedoes and the director of navigation (staff captain). They are all either captains or commanders, the two last being Naval officers (zur Disposition). Besides these, there are a director of construction (chief constructor), director of engine building (chief engineer), a director of works, and an administrative director,* all of whom are superior officials, and are of equal rank. The departments in charge of these officers have the requisite offices, business premises, workshops, assistants, and staff; while the superintendent of the dockyard has his own office, which is managed by a commander acting as his assistant, who has also the control of the dockyard police and fire-brigade. The superintendent of the dockyard has a lieutenant as his adjutant.

Vessels not in commission are under the control of the Captain of the Fleet Reserve, torpedo-boats under that of the director of torpedoes, who is a commander. For each vessel a special store is provided, containing all the stores she would require for fitting out. In addition the Captain of the Fleet Reserve has charge of the dockyard and harbour craft.

The Department of the Director of Ordnance has charge of the gunnery equipment of vessels. The Chief Constructor's and Chief Engineer's Departments are responsible, under orders from headquarters, for the construction of new vessels and machinery, as well as the maintenance in proper repair of the hulls and machinery of existing vessels. The Works Department is responsible for all work on quays, docks, etc., in the dockyard and the port. The Staff Captain's Department is entrusted with the care of nautical instruments and with fitting them on board each vessel, as well as with the correction of charts and sailing instructions. The Torpedo Department is a small distinct establishment, where torpedo-boats are repaired and kept ready for sea.

* This officer would seem in some respects to correspond with our Civil Assistant.

The Administrative Director's Department collects the various accounts and keeps a record of the expenditure occurring under the different heads of charge in the Budget. For each work a separate account is made out, to which is debited a certain percentage of establishment charges, of expenses for maintenance of workshops, etc., this percentage being annually fixed for each department.

The dockyard *personnel* is divided into a technical, an administrative, a supervising, and a workmen's staff. The police duties are performed by Berlin policemen.

Shipbuilding in the dockyards.

Although private industry is extensively employed for the construction of new ships, and more particularly for numerous fittings, a point is nevertheless made of increasing, as far as possible, the efficiency and capabilities of the Imperial dockyards, by entrusting them with the building of new ships and effecting alterations, etc. At present there are in course of construction at the Imperial Dockyard in Wilhelmshaven, the first-class battleships Kaiser Friedrich III. (third instalment voted), and Ersatz Friedrich der Grosse (first instalment); at the Imperial Dockyard at Kiel, the first-class cruiser Ersatz Leipzig (second instalment); at the Imperial Dockyard at Danzig, the second-class cruisers Ersatz Freya (second instalment) and M (first instalment). All materials for ship and engine-building, up to the heaviest armour-plates and the largest castings and forgings, are procured in Germany. The coal is also of home production, and in exceptional cases only is procured from England. The requirements in the event of war are fully provided for at home.

Workmen.

Workmen are entered as required. It may be assumed that 1000 men are put on for the construction of a battleship, apart from the staff required for the current work of the dockyard. In view of the new construction now in hand there should be employed at present in the imperial dockyards, at Wilhelmshaven, from 5000 to 6000, at Kiel from 4000 to 5000, and at Danzig 2000 men, or a total of about 12,000 men. A shipwright earns from 3*d.* to 4½*d.*, a carpenter a trifle more, and a leading man up to 5⅛*d.* per hour. There are ten working hours in the day. Special interest is taken in the welfare of the workmen, all matters relating to them being dealt with in the "Reichs-Marine-Amt" at Berlin by a special subsection established for this purpose. A workman is not entitled to a pension, but there exists an old age and sickness insurance fund, as well as provision for insurance against accident. In Gaarden and Ellerbeck, two small places situated on the harbour of Kiel, workmen's colonies have recently been created without state assistance,

by a workmen's building society, which provides cheap dwelling accommodation for 200 workmen's families. A family dwelling, being a cottage containing three rooms and a kitchen, costs from 13 to 16 marks rent a month, and ten years after allotment it will pass into the possession of the workmen, while at the end of thirty-five years it becomes his free and unencumbered property. A special committee provides for the establishment of stores for the workmen, where they can buy all they require at moderate prices.

The "Storekeeper and Accountant's" Offices, and Financial Management.

The funds voted by the Reichstag year by year for the requirements of the Navy are paid over to the various departments by direction of the Naval Secretary of State, through the General-Militär-Kasse (military exchequer), which is a pay office of the German Ministry of War in Berlin.

At both Kiel and Wilhelmshaven, there is an "Intendant" (a storekeeping and accountant officer), a superior official with officer's rank, whose duty it is to collect and revise all accounts. His subordinates in the various departments, as, for instance, the paymasters of the seamen's sub-divisions, draw up their accounts in accordance with the estimates, and hand these in to this officer. There is a pay-office at each port, in which business is conducted somewhat after the style of a bank, payments being made only by the order of the authorities entitled to give such orders. The storekeeping and accountant official administers the stores of provisions and clothing, the garrison establishments, the schools, the infirmaries, the barracks and barrack ships, and for all account purposes controls the paymasters of every commissioned vessel.

The ships' accounts (for all vessels are attached to one or the other of the Naval ports, although serving abroad) are in the first place sent in for revision to the Port Accountant Officers. The chief accounts are kept by the General Accountant Department, while the whole of the accounts are finally checked by the Audit Department of the German Empire at Potsdam. There the annual accounts are revised and a final discharge is granted to the respective accounting officials, the various commanders of ships, the departments, etc. The Federal Council and the Reichstag grant a discharge to the Imperial Chancellor, in whose hands the administration of the entire German Imperial Budget is placed.

As the garrison establishments are subject to the control of the Port Accountant Officer, it may be stated here that, generally speaking, men who are not on board their vessels are lodged in barracks, while those only who belong to the torpedo sections, for want of barrack accommodation, are lodged in barrack-ships. Both in view of the climate on the German coast in winter, and for economical,

disciplinary, and sanitary reasons, barracks are preferable to barrack-ships.

THE PERSONNEL.

The *personnel* may be divided, in the first place, into two main divisions, viz., the combatant and the civilian;* there being a further subdivision into officers, non-commissioned officers (warrant officers†, midshipmen and petty officers), and men (including not only seamen, stokers and artificers, but leading seamen, chief stokers, and chief artificers). An essential difference between officers and the civilian officials is that the former, as well as the crews, take an oath of allegiance to the Emperor, as the Supreme Commander-in-Chief, while the official is, in addition, sworn to the Imperial Constitution. Thus, every civilian official is personally responsible to the law as regards the legality of his official acts, while if a combatant violates any legal enactment in consequence of orders received from a superior, the latter alone will, generally speaking, have to bear the responsibility. **Main divisions.**

Officials, with the exception of paymasters, have only a general military rank, corresponding to that of the combatant officers who are receiving the same pay as themselves.

The officers in the Navy are classified into the navigating officers' corps, the marine infantry officers' corps, mechanical and torpedo engineers' corps, gunnery and torpedo officers' corps, and medical officers' corps. The grades are similar to those in the British Navy, assuming that the "lieutenant of eight years' standing" in the British Navy corresponds to the captain-lieutenant in the German, the latter ranking equally with a captain in the army, while a corvette-captain (commander) ranks with a lieutenant-colonel. **Officers in the Navy.**

There are in the Service 713 Naval officers; viz., two Admirals, three Vice-Admirals, ten Rear-Admirals, forty-three captains, seventy-eight commanders, 164 captain-lieutenants, 242 lieutenants, and 171 sub-lieutenants. Moreover there are actively employed in permanent positions on shore in the various Naval Departments, twenty-four Naval officers (zur Disposition), from the rank of lieutenant upwards. Every spring and autumn the Naval officers are distributed to the various vessels and departments. Generally speaking, appointments are held for two years. In the central departments at Berlin there are five flag-officers, twenty-eight

* The above rendering appears to be better than "official," which is preferred by Captain Ferber. Naval officers employed at the Admiralty hold civilian appointments, and are, for the time being, civilians. It is for this reason that the Naval Lords wear plain clothes and not uniform when inspecting the Dockyards.—ED.

† Literally, deck officers.

Chief Classes.	Naval Officers.	Marine Infantry Officers.	Engineer and Torpedo Engineers.	Gunnery Officers.	Torpedo Officers.	Medical Officers.
Flag Officers.	Admirals.					
..	Vice-Admirals.					
..	Rear-Admirals.	..	..	..	..	1st-class Surgeon-General.
Staff Officers.	Naval Captain.	Colonel.	..	..	..	1st-class Surgeon-General.
..	Commander.*	Lt.-Colonel. Major.	Staff Engineers.	..	..	2nd-class Surgeon-General, Station Surgeon. 1st-class Chief Staff Surgeon.
Captain-Lieutenant.	Captain-Lieutenant.	Captains.	Chief Engineers.	Captain.	Captain-Lieut.	2nd-class Chief Staff Surgeon, Staff Surgeon.
Subaltern Officers.	Lieutenants.	First Lieuts.	Engineers.	First Lieuts.	Lieutenants.	1st-class Assistant Surgeon.
..	Sub-Lieuts.	Second Lieuts.	Assistant Engineers.	Lieutenants.	Sub-Lieuts.	2nd-class Assistant Surgeon.

* Corvette-Captain.

captains and commanders, sixteen lieutenant-commanders, and three lieutenants.

Training.

A few words may be said on the training for Naval officers. Youths at the age of from sixteen to eighteen, after due examination as to their personal and educational qualifications, are appointed cadets. After receiving one month's military training on shore, these cadets to the number of seventy every year, are embarked on the training-ships, which, during the winter half-year, go for a foreign cruise, returning in the spring. After having passed their examination and having been promoted to the rank of midshipman, they are ordered for another year's service to the training-ships. In the spring of the second year of training a second examination has to be passed, and during the following summer the midshipmen have to go through special courses of training on board the gunnery and torpedo school-ships. In autumn they are ordered for a ten months' course to the Naval school at Kiel, and at the conclusion of this they have to pass the officer's examination. After a subsequent course of training with one of the Naval battalions in infantry service, they may expect promotion by His Majesty's "Cabinet-Ordre" to the rank of sub-lieutenant after altogether three and a half years' service. Later on, after these officers have acquired thorough experience in the Naval Service, some particularly capable lieutenants and captain-lieutenants, at an age averaging thirty years, are ordered to the Naval Academy for two years during the winter months. In order to be promoted to higher rank, they must give proof of their qualifications. Promotion is not absolutely dependent on sea time, although, as far as possible, a point is made of letting each officer, of any rank, fill for a time certain specified positions on board. Those to be promoted to the rank of commander and upwards are specially selected, with due regard to seniority. On an average the rank of lieutenant is attained at twenty-four, that of captain-lieutenant at thirty-one, that of commander at thirty-nine, that of captain at forty-five, and that of Rear-Admiral at fifty years. Officers not found qualified or no longer fit for service at sea must retire, but there is no compulsory age for retirement.

Mechanical and torpedo engineers.

The superintendence of the machinery on board of men-of-war is entrusted to the engineers. On shore they are only employed for the purpose of training their staff (engine-room artificers, apprentices, and stokers) at the crew depôts, dockyard divisions, engineers' training-schools, and on board the engineers' training-ship.

The designing of the machinery is in charge of the superior technical officers of the "Reichs-Marine-Amt" and the dockyards. Engineers are sometimes ordered to the dockyards in order to

supervise the works of maintenance, and for their own information during the erection of new engines. The engineers are drawn from the number of such chief engine-room artificers as, after passing a special examination, are considered qualified, in view of their experience, education, and personal fitness, to be promoted to the rank of assistant engineers. The average age for promotion to this rank is thirty-six years. Specially qualified engineers are ordered, for a two years' course of study, to the Technical Academy at Charlottenburg, near Berlin. There are four staff engineers, thirteen chief engineers, thirty-two engineers, and fifty-four assistant engineers. The torpedo engineers have to pass through approximately the same course of training as the engineers; they are employed as technical experts at the dockyards, etc. There are two chief torpedo engineers, six torpedo engineers, and three assistant torpedo engineers.

Gunnery and torpedo officers.

Gunnery and torpedo officers are employed in the administration and proper maintenance of the arms, ammunition and stores of the Ordnance, Torpedo, and Submarine-mining Department. All these officers are promoted from petty officer, that is to say, they are drawn from the number of qualified chief gunners or of chief torpedo-men. They attain officers' rank at an average age of twenty-eight, and, according to seniority and qualification, may rise to the rank of captain-lieutenant. There are sixty-eight gunnery and torpedo officers.

Medical officers.

The Naval surgeons on the active list and in the reserve form the medical officers' corps of the Navy, at the head of which is the surgeon-general of the Navy, who is also chief of the sanitary officers' corps. His representatives in the Naval ports of Kiel and Wilhelmshaven are the "station surgeons," who have the control of the hospital and medical arrangements. One or two surgeons are ordered to every vessel in commission. The medical officers are drawn from the number of young medical men who enter the service, with due medical qualifications from the Universities. The appointment to the rank of chief staff surgeon (surgeon-major) is conditional on passing a special examination in military medical subjects. There are in the Naval service one surgeon-general, two station-surgeons, six first-class chief staff-surgeons, nine second-class chief staff-surgeons, forty-five staff-surgeons, forty-six assistant-surgeons and seven young surgeons with the rank of warrant officer (these latter being candidates for the Naval medical career).

Officers of the Reserve and "Seewehr."

Officers quitting the active service, as long as they are still by law liable to military service, *i.e.*, up to their fortieth year, belong to the Reserve or "Seewehr," which is the Naval equivalent to the "Landwehr," or second reserve. These officers come from the ranks of the men who have obtained certificates of sufficient service to qualify

them for appointment to the Reserve. They are called up at certain periods for a two months' course of training, and promoted according to their qualifications, in the same way as officers on the active list. The officers of the Reserve and of the "Seewehr," of the first and second muster, are comprised under the general designation of "Offiziere des Beurlaubtenstandes" (officers regarded as on furlough), and are divided into Naval officers, officers of the marine artillery, officers of the marine infantry, engineers, torpedo officers, medical officers, and Naval architects and mechanical engineers (for the dockyards). According to the last Navy List the officers of the Naval Reserve and "Seewehr" include twenty captain-lieutenants, fifty-seven lieutenants, 104 sub-lieutenants, and sixty-seven warrant officers or candidates for the career of Naval Reserve officers.

Officers of Mercantile Marine.

It should be noted that in July, 1896, His Majesty granted as a mark of special favour to commanders of merchant vessels, while they are officers of the Naval Reserve or "Seewehr," or who have been Naval officers and have left the Navy with permission to still wear their uniform, the privilege of carrying the German Mercantile Flag marked with the insignia of the "Iron Cross." It is hoped that this will help to create, in future, a closer touch between the Mercantile Marine and the Navy. As a matter of fact, a number of officers of the Mercantile Marine have already offered their services voluntarily to the Navy, in order to qualify for the above-mentioned privilege.

Engineers.

According to the Navy List, the engineers' corps of the Naval Reserve and "Seewehr" numbers forty-four, while there are 109 petty officers, viz., chief engine-room artificers and engine-room artificers, any further requirements being provided for by the large number of volunteers available in the event of war.

Technical officials.

The superior technical officers of the shipbuilding, engineering and works branches, who are responsible for all shipbuilding in the dockyards, who superintend the construction of vessels in private yards, and who also, to some extent, are employed in the construction department of the "Reichs-Marine-Amt," are: eleven directors of construction with the title of "Oberbaurath," seven constructors ("Baurather") and fifty-five inspectors of construction ("Bauinspectoren"), and foremen ("Baumeister"). Of these, thirty-three belong to the ship-construction branch, twenty-nine to the engine-construction branch, and eleven to the harbour-works branch. Moreover, there are thirty-five "Baufuehrer," *i.e.*, candidates for this official career. After one year's practical work at the dockyard, and a four years' course of study at the Technical Academy, the

candidates must pass their State Examinations in order to receive an appointment as Naval constructor after an apprenticeship of altogether eight years' duration, that is to say, they will reach this stage at an average age of twenty-eight years.

The technical officials rank according to seniority. In order to be promoted, they must be recommended as qualified by their superior officer. From the rank of "Baurath" upwards a stricter selection is made. Some of those holding the rank of "Oberbaurath" are transferred as technical advisers to the Reichs-Marine-Amt. Of these, there are at present two, viz., one for engine construction and one for Naval architecture. These officials, as a rule, only embark for trials. There are 390 subordinate technical officers employed in the dockyards. They are the assistants of the superior technical officials, and act as draughtsmen, inspectors, foremen, and leading men.

Accountant officers.

The superior accountant officials of the Navy are: eight Admiralty councillors of the Accountant Department of the Reichs-Marine-Amt, and twenty comptrollers of accounts, called "Intendanturrath" and "Referendare." Nearly all of these have taken a degree in law, and, after four years' study at the University, have selected the career of accountant. After two years' practical work, and after having passed the State examination, they receive an appointment as "Intendantur-assessor." They are employed in the port accountant's offices, and as assistants to the administrative directors at the dockyards. They advance by seniority into higher positions. Independent positions are occupied by the storekeeping and accountant officer (Intendant), who is the adviser of the Commander-in-Chief of the station in all administrative matters, and is himself the head of the "Stations-Intendantur," and by the administrative director of an Imperial dockyard, who superintends the administration of the various departments, as well as the management and control of stores in the dockyard. From these superior administrative officials, the Admiralty councillors for the accountant branch at the Reichs-Marine-Amt are chosen. There are a considerable number of subordinate accountant officials employed at the Intendants' offices, the dockyards, and the Reichs-Marine-Amt for dealing with account matters, and drawing up and checking the numerous accounts and statements necessitated by the voluminous account business of the Navy.

Paymasters.

Matters of pay and account afloat and of the various Naval divisions ashore are attended to by seven chief paymasters, and seventy-nine paymasters, or assistant paymasters. As regards their administrative functions, they are subject to the jurisdiction and control of the "Station Intendant." These officials hold a definite

Naval rank, because they are brought into such intimate contact with the combatant branch of the service. They all rise from the ranks of petty officers, and are subordinate officers to whom access to the superior official's career is barred. The rank of an assistant-paymaster is attained after about twelve years' service at an average age of thirty years. They are promoted, according to seniority and qualifications, to the post of paymaster, who ranks equal to a Naval lieutenant, and eventually to that of chief paymaster, who ranks equal with a captain-lieutenant.

The crews comprise warrant officers, petty officers, and seamen. **The crews.**

Recruiting. The men for the Navy are obtained by general conscription and voluntary enlistment. The constitution of the German Empire enacts that: "Every German is liable to military service at the age of twenty and shall not be allowed to fulfil this obligation by substitute. He will serve three years in active service, four years in the reserve, and up to the end of his thirty-ninth year in the "Landwehr" or "Seewehr." The maritime population of the Empire, including engineers, artificers and carpenters employed in the Mercantile Marine, are liable to serve in the Navy. The business of conscription is attended to, for the Navy as well as for the army, by war office officials. In every parish within the Empire recruiting registers are kept, which are based on the registers of birth, etc., and everyone liable to serve is bound by law to report himself on 1st January of the year in which he attains the age of twenty. He has to report himself again every year until a definite decision has been pronounced concerning him. The various branches of the Navy ascertain every year the number of recruits they will require. The Administrative Branch thereupon informs the Prussian War Ministry how many men are required and when and where they are to join. If the conscripts among the maritime population should not suffice for the wants of the Navy, recourse is had, in the first place, to conscripts living on the islands and on the coasts of the Baltic or North Sea, men connected with river and canal shipping, ferrymen and boatmen, stokers, metal workers, ships' carpenters and the like.

Numbers raised. There were levied for Naval purposes:—In 1885 from the maritime population 1568, landsmen 1058; in 1892 from the maritime population 1994, landsmen 2578; in 1893 from the maritime population 2203, landsmen 1898; in 1894 from the maritime population 2995, landsmen 1879. This shows that there is no lack of the requisite material for the Navy, and if necessary all that will be required is to levy more recruits; but in consequence of the decline of sailing-ships, and because there are no suitable trade-schools for the nautical profession, there is nowadays a lack of well-trained sailors in all

Position in the Service.	Two seamen's divisions of two sub-divisions each and one boys' division.	Two dockyard divisions of five companies each.	Two torpedo divisions.	Four marine artillery divisions.	Two battalions of four companies each.	Military (Combatant) Personnel.				Total.
						Gunnery branch.	Torpedo branch.	Mining branch.	Surveying branch.	
Warrant Officers	123	396	146	24	..	63	67	19	13	851
Petty Officers	1,206	1,490	523	205	168	38	38	31	..	3,779
Leading seamen, and seamen	7,034	3,194	1,567	1,784	1,038	..	..	..	..	14,617
Staff bandsmen	5	..	..	..	..	..	..	..	..	5
Bandsmen	97	..	..	..	..	..	..	..	..	97
Shoemakers and seamen in workshops ashore . . .	..	154	..	..	..	..	..	..	..	154
Hospital assistants and Naval ambulance men	..	173	..	..	..	..	..	..	..	173
Paymaster candidates and apprentices	..	148	..	..	..	..	..	..	..	148
Gunsmiths	..	12	..	..	..	..	..	..	..	12
Boys	600	..	..	..	..	..	..	..	..	600
Total	9,145	5,567	2,236	2,013	1,206	101	105	50	13	20,436

mercantile Navies, and naturally this scarcity must also affect the Navy, in which properly trained sailors are a desideratum. The best remedy for this lack of trained recruits is to create a large and capable staff of petty officers, as the petty officer plays a most important part in the training of the men. The recruits for the Navy are all of German nationality, scarcely any being older than twenty-three, and all must at least have passed through an elementary school. For many decades past education has been compulsory in Germany, every child being bound to attend school from the seventh up to at least the thirteenth year. The preliminary training thus received is no doubt a most important element in the inculcation of habits of discipline. In the recruiting year 1894–95, 256,142 recruits in all were levied for the Army and Navy together, among whom there were only 562 illiterates, that is to say, 0·22 per cent. as compared with 2·37 per cent. in the financial year 1875–76.

Reserve.

While belonging to the Reserve, that is to say, up to within seven years after the time of conscription, the men are bound to attend two periods of training of eight weeks each. There is an arrangement for a shortened term of active service in the case of those who can furnish proof of the educational qualification for "one year's voluntary service" * by a master's certificate. For able seamen, engineers and pilots, in view of their preliminary technical training, the term of service may be reduced to one year.

Voluntary enlistment.

In addition to the recruits levied by conscription, 300 boys are entered once annually at the age of from fifteen to eighteen years. On entering they engage for a two years' apprenticeship and a subsequent seven years' term of service. Last year 1400 boys applied for enlistment as "boys" in the Imperial Navy. The training of the boys on board the training-ships Stosch, Stein, Gneisenau and Moltke, lasts two years. The petty officers of the Navy are drawn from the ranks of the men who have joined as boys, as well as from suitable men among the conscripts and volunteers. To seafaring men the careers of boatswain, gunner, quartermaster, signalman, master-at-arms, and storekeeper, are open, while landsmen may become artificers,† stokers, paymasters, torpedo-men, hospital assistants, armourers, carpenters, sail-makers, painters, stewards, writers, bakers, shoemakers, or tailors. Promotions are made after the practical training has been completed, and after the candidates have proved their qualification and passed the prescribed examinations. Some of the leading men employed in the engine-

* In the army these are the class from which the reserve officers are drawn.—*Translator*.

† Literally, engineers.—Ed.

room department may be permitted to go in for the engineers' career. The present arrangements for the training of engineers has, no doubt, answered well, but the age at which the men now enter upon this career, averaging thirty-six years, is too high. As a matter of principle, all subordinate and petty officials' positions in the Imperial and State Civil Service are preferentially filled with time-expired non-commissioned or petty officers. Thus, a large number of these men find permanent employment at the dockyards, in the Accountants' Offices, and in other Naval departments.

Schools.

For men.

At the crew depôts, the seamen's, the dockyard, and the torpedo divisions there are special schools for giving the men a scientific preparatory education for the various branches of the Service. Engine-room artificers, quartermasters, and torpedo-men are prepared at the Warrant Officers' School at Kiel for the examinations to be passed by them prior to promotion. These schools are purely technical schools, their sole object being to teach the pupils the special knowledge required in their particular branch. The Warrant Officers' School is under the supervision of the Education Inspection Department of the Navy. The head-master of the school is a pensioned captain (zur Disposition).

For officers.

The Naval School at Kiel prepares Naval cadets to become officers. The examinations to be passed by midshipmen and cadets on entering the Navy, and while on board the training-ships, are held at this school. The large number of special branches of science with which Naval officers are concerned has led to instruction in gunnery and torpedo work being only given on board the school-ships. Midshipmen and Naval cadets are during the whole term of their training under the supervision of the Inspector of Education. The latter is a flag officer, who in respect to educational matters controls the training-ships Stosch, Stein, Gneisenau, and Moltke, besides having direct control of the Naval School and the Naval Academy at Kiel. The object of the Naval Academy is to prepare officers for the higher positions in the service.

A classification of Naval officers into gunnery, navigating, and torpedo officers, is not feasible for practical reasons; it would necessitate a larger number of available officers. It is therefore only by many years' practical experience and successful private study that officers are enabled to acquire an exhaustive knowledge of all the various branches of science connected with their profession.

The Matériel.

The *matériel* of the fleet has scarcely been increased during the last few years, except in so far as necessary to replace antiquated or worn-out vessels. The list of the Navy at the present time comprises eighty-eight men-of-war. Among these are twenty-two battleships (six first-class, three second-class, five third-class, and eight fourth-class), thirteen armoured gunboats, eighteen cruisers (three second-class, six third-class, and eight fourth-class), three gunboats, ten despatch-boats, fourteen training or school-ships, and ten ships for special purposes.

Battleships. The first-class battleships Kurfürst Friedrich Wilhelm, Brandenburg, Weissenburg and Worth of 10,100 tons form the main strength of the German Navy. They have speeds up to 17·5 knots, and a complement of 556 all told. Two still larger battleships are now building, viz., the Kaiser Friedrich III. and Ersatz Friedrich der Grosse, with a displacement of 11,130 tons and 13,000 horse-power. The second-class battleships, or, as they ought now to be called, first-class cruisers, König Wilhelm, Kaiser and Deutschland have, during the last few years, been refitted. The third-class battleships Baden and Bayern have been fitted with new engines and boilers, and their hull has, at the same time, been subjected to a thorough general repair. As soon as the Baden and Bayern have been dealt with, the Sachsen and Wurttemberg will be similarly treated. The fourth-class battleships Siegfried, Beowulf, Frithjof, Hildebrand, Heimdal, Hagen, Odin and Aegir are an essential part of the scheme of coast-defence. The last is fitted with water-tube boilers, and has electrical machinery for working the anchor-capstans and steering-gear, and for hoisting boats. These vessels have a displacement of 3600 tons and a speed of 15 knots. Their complement is 276 men.

Cruisers. A first-class cruiser of 10,650 tons displacement and 13,500 horse-power, provisionally named Ersatz Leipzig, is now building. She will probably be completed in two years. The second-class cruisers Kaiserin Augusta, Irene, and Prinzess Wilhelm are in commission. The Kaiserin Augusta (6052 tons) is the first vessel of the German Navy that has been fitted with three propellers. She has three triple-expansion engines, of which the after one, placed in the centre-line of the vessel, drives the central propeller, which projects furthest astern; while the two lateral propellers, which are placed further forward, are driven by the two forward engines. Eight cylindrical double-ended boilers, with forty-eight furnaces, supply the steam for the engines, which work up to from 14,000 to

15,000 horse-power. The maximum speed is 22½ knots. The complement is 418 all told. Of this type of vessel there are now five being built, viz., the Ersatz Freya, K, L, M, and N, the time which their construction is supposed to take being two and a half years. They are to have a displacement of 5650 tons and 9000 horse-power, and they will all be fitted with three propellers and water-tube boilers. Among the third-class cruisers, the Gefion is of recent construction. Other vessels of this class are the Arcona, Alexandria, Olga, Marie, and Sophie, some of which are employed on foreign service. The fourth-class cruisers, viz., Seeadler, Kondor, Kormoran, Geier, Bussard, Schwalbe, and Sperber, are, with three exceptions, at present serving abroad as station-vessels.

The gunboats Habicht, Wolf, and Hyäne are about to be replaced by fourth-class cruisers, one of which, the protected cruiser G, is building.

The despatch-boat Hela has only just been completed, and deserves to be particularly mentioned. Displacement, 2003 tons; horse-power, 6000; speed, 20½ knots. The complement is 169 men. She may be classed with the Komet, Meteor, Jagd, Wacht, Greif, Pfeil, Blitz, Kaiseradler, and Zieten, which have all proved efficient for their intended purpose of serving as the "eyes of the fleet."

There are in reserve thirteen old-fashioned armoured gunboats, destined for the purpose for which they were originally built, namely, to serve as harbour-defence vessels.

The torpedo-boat flotilla consists of eleven "torpedo-division-boats" of from 250 to 380 tons' displacement, and from 2000 to 4500 horse-power, with about 150 torpedo-boats.

The fourteen training or school-ships, Mars, Charlotte, Stosch, Stein, Moltke, Gneisenau, Blücher, Nixe, Carola, Rhein, Grillë, Ulan, Hay, and Otter, of which the three last named serve as tenders, have allotted to them particular branches of training. Most of them are in commission; but two, viz., the Charlotte and Nixe, are in reserve.

As vessels for special purposes, I may mention the Hohenzollern (Imperial yacht), the Pelikan (transport-vessel), Moewe and Albatross (surveying-vessels), Loreley (station-vessel at Constantinople), and the old ironclads, Preussen, Friedrich der Grosse, Friedrich Karl, Kronprinz, and Arminius, which have been disrated during the last few years, and are now classed as "harbour-vessels" in the Navy List.

As regards the preparation of designs and the construction of ships for the German Navy, Mr. A. Dietrich, the "chief constructor," who since 1894 has been at the head of the construction department of the Civil Administrative Branch, read an exhaustive paper at the meeting of the "Institution of Naval Architects," held at Char-

lottenburg, near Berlin, on 11th June, 1896. The vessels now building were discussed by him on that occasion, and are described in Chapter II. by M. Weyl.

Private Shipbuilding Establishments.

A few words may be said of the numerous private shipyards existing on the German coast, especially of those which are of most importance to the Imperial Navy. Herr Schichau's Works at Elbing and Danzig have become particularly well known through supplying nearly all the torpedo-boats for the German Navy and a large number of such boats for foreign Navies. They have moreover built for the Imperial Navy some of the smaller-sized older vessels, as well as the new third-class cruiser Gefion. In his newly established shipyard at Danzig, Herr Schichau generally builds large transatlantic merchant vessels. Probably the most considerable of the German shipbuilding establishments is the Vulcan Ship and Engine-Building Company, Ltd., at Bredow, near Stettin, which has an excellent reputation on account of its success in the construction of transatlantic passenger and freight steamers. The Preussen, the first ironclad entrusted by the German Naval authorities to a German private firm, was built at this yard, and afterwards in quick succession a large number of other war-vessels were turned out, among which may be mentioned the battleships Sachsen and Wurttemberg, the cruisers Stein, Stosch, Carola, Olga, and Irene, the battleships Oldenburg, Brandenburg, and Weissenburg, the Imperial yacht Hohenzollern, and the despatch-boat Komet. There are now building at this shipyard the two second-class cruisers K and N. The Vulcan Company has built a number of battleships, protected cruisers, and torpedo-boats, and has now some vessels in hand for the Chinese Navy. Messrs. Blohm and Voss and the Reiherstiegwerft yard at Hamburg, which are well known for the construction of merchant vessels, have also been entrusted with a few new vessels as well as with repairs for the German Navy. The former are at present constructing for their own use the largest floating dock in existence, which will be of special value for docking the large battleships of the Imperial Navy. The Weser Shipbuilding and Engineering Company, of Bremen, has built the nine armoured gunboats of the Wespe class, as well as the Brummer and Bremse, the fourth-class battleships Beowulf and Frithjof, and the despatch-vessel Hela. At present the cruiser L is in hand. The "Germania" Shipbuilding and Engineering Company, formerly the

"Norddeutsche Werft, at Gaarden, near Kiel, has lately been taken over by the firm of Krupp, of Essen. This shipyard has built for the German Navy the despatch-vessels Blitz, Greif and Meteor, and quite a number of vessels and engines of old type, as well as, more recently, the second-class cruisers Prinzess Wilhelm and Kaiserin Augusta, the fourth-class battleship Siegfried and the battleship Worth. The cruiser G is now in hand. The "Germania" yard has also built, with great success, torpedo-boat destroyers and torpedo-boats for foreign Navies, amongst others for the Turkish and the Brazilian Navy. At the "Germania" engine-works, which are still located at Tegel, near Berlin, the engines of 13,000 horse-power for the Ersatz Friedrich der Grosse, and those of 10,000 horse-power for a second-class cruiser are in hand. These engine-works are to be transferred to Gaarden, where some extensions of the shipyard are also in progress, on which account these works deserve special notice.

The Estimates.

The Navy Estimates are prepared every year in the Reichs-Marine-Amt, and after being examined by the Imperial Exchequer (Reichsschatz-Amt), are submitted to the Federal Council, and in accordance with the decision taken by this Council are submitted to the Reichstag in the name of the Emperor, being introduced by the Naval Secretary of State as plenipotentiary to the Federal Council, or else by special commissioners. When the estimates have been passed by the Reichstag in the form of an Act the latter is sanctioned by His Majesty the Emperor, countersigned by the Imperial Chancellor, and thereupon published. The principal discussion of the estimates in the Reichstag, as a rule, takes place in the month of January of each year. The estimates give in detail, under separate headings and sub-sections, the funds demanded for the requirements of the Navy. Permanent and exceptional, or non-recurring expenses are separately treated. The financial year commences on 1st April and ends on 31st March of the next year.

The programme of 1873 for the establishment of a fleet still supplies the lines on which the Navy is supposed to be modelled. It included eight armoured frigates, six armoured corvettes, seven monitors, two floating batteries, twenty corvettes, six despatch-vessels, eighteen gunboats, two gunnery vessels, three sailing brigs, ten large and eighteen small torpedo-vessels. The programme was drawn up by General von Stosch, Chief of the Admiralty, and was approximately carried out by the end of his term of office. In 1883 a

programme for the further development of the fleet was worked out by General von Caprivi, the new Chief of the Admiralty, who even at that early period was constrained to describe the original programme as "retaining a theoretical value only." The endeavour to provide, as soon as possible, a sufficient number of torpedo-boats for coast defence caused the requisite increase of the battle-fleet to be altogether thrust into the background at this period. The present shipbuilding programme is based on the memorandum submitted with the estimates for 1889–1890 by Rear-Admiral Pleusner, who had become Naval Secretary of State. It demanded, in view of the tasks imposed on the Navy, and the increased requirements made with regard to various classes of vessels, the construction of—

Four battleships of the latest type ;
Nine armoured coast-defence vessels ;
Seven protected cruisers ;
Four unprotected station cruisers ;
Two despatch-vessels ;
Two torpedo-division boats.

Credits for the last two of the protected cruisers of this programme are now being asked for. Six battleships have since been voted, out of which four are completed, while two of the armoured coast-defence vessels are still in abeyance. New views with regard to Naval warfare, and as to the value of the various types of vessels, are apt to upset, very soon, any shipbuilding programmes drawn up in advance for a number of years to come. In the new estimates for 1897–1898 credits are demanded for—

One first-class battleship to replace the König Wilhelm ;
Two second-class cruisers, "O" and "P" ;
Two fourth-class cruisers, to replace the Hyäne and Iltis ;
One despatch-vessel, to replace the Falke ;
One torpedo division-boat and a number of torpedo-boats.

Conclusion.

I have endeavoured to give a picture of the German Navy, and to show how the executive authority, the administration, and the *personnel* are connected, as far as it could be of interest to foreign Navies. Descriptions of the ships under construction and the estimates are dealt with elsewhere in the *Naval Annual.*

It must be admitted that the *matériel* of the Navy requires to be perfected in a good many respects in order to come up to the requirements of modern Naval warfare. The stagnation of shipbuilding for replacing antiquated vessels since the middle of the eighties is now making itself felt. The new first-class battleships and cruisers recently completed, as well as the general efficiency of the private shipyards and industrial establishments, etc., vouch for the existence in Germany of all requisites for a further development of the Navy without recourse to foreign countries. But apart from the question of supplementing the *matériel*, it must be stated that the organisation of the Navy, the efficiency of the existing *matériel*, and more especially its well-trained *personnel*, are a guarantee of the fitness of the German Navy for action.

FERBER,
Korvetten-Kapitaen, Z.D.

CHAPTER V.

The Attack of Ships by Artillery Fire.

In the *Annual* for last year was given a series of rectangles, whose areas were proportional to the energy of the fire that might be delivered per minute by all the guns of various classes of ships. During the past year this "energy of fire per minute" has been adopted by some writers, and the expression used as if it had long been recognised as a measure of fighting power, while, on the other hand, it has been denounced by others as altogether misleading. The truth is, that in a question into which many elements enter, a false conclusion may be arrived at by considering or by giving undue prominence to any one element alone. This does not alter the fact that some new method of estimating the power of ships' fire was needed, in order to give quick-fire the weight due to its speed. No one will deny that the fire delivered by a ship is a most important element in her fighting power, and one which should, if possible, be measured. To reckon up the power of an armament on the supposition that every gun is fired at the same rate was always misleading, and, since the introduction of quick-fire, had become intolerably wrong. The only remedy was to bring in the element of time, and this is done by taking the energy per minute*—that is to say, the energy of every gun multiplied by the number of rounds which it fires in a minute. Then followed the question as to what rates to adopt, and it was decided to apply such as were obtained at sea by the Excellent school of gunnery, alike to the guns of all powers. Though this is subject to error, the error is probably small, for quick-fire guns are easily supplied to existing ships, and in actual war may be safely assumed to be of the best obtainable type. There remains another objection: that the quick-fire rate obtained at sea in peace time would be less easy to keep up in action than the slow fire of the heavy guns. Nevertheless, it was desirable to depend on standard figures, and not on those assigned by arbitrary

* Admiral Colomb independently suggested the inclusion of energy of fire per minute among the factors making up fighting power in a paper read at the United Service Institution, 18th March, 1896.

individual judgment, so that the Excellent rates were adhered to, so far as they could be obtained, leaving it open to any individual to make such corrections as are matters of opinion.

Energy of fire.

It was never intended that a ship's fighting powers, or even her fire, should be considered to be truly measured by these rectangles. They showed, however, a very important element of power. With ships possessing equal provision for using their guns, probably a fair comparison might be made, though it need hardly be said that such a comparison must fail between two ships so placed that one can use a much larger proportion of her guns than the other. The figures shown, however, are, in some cases, such, that overwhelming advantages would be needed to neutralise a difference brought out by calculating the energy of fire per minute, although little suspected until this test was applied. For example, the United States cruiser New York, of 8500 tons displacement, might naturally be expected to be a match for the Chilian cruiser Esmeralda, of 7000 tons; but if their total energies of fire per minute be calculated, the New York only delivers 119,904 ft.-tons against the 509,091 ft.-tons of the Esmeralda. A difference so startling as this surely has a very practical bearing, yet it is probable that this element of weakness in the New York might remain, not perhaps unsuspected in general terms, but utterly unappreciated as to its extent, unless some test of this kind were applied. The explanation of the principal element involved in the case is not difficult, and, once stated, is sufficiently obvious. The striking energy of a shot depends primarily on its velocity, but also, in a less degree, on its weight. Supposing, then, a smaller and larger projectile to have equal velocities, their energies will be in proportion to their weights, and for shot of similar shape, the weight will be in proportion to the cube of their calibres. The New York carries 4-in. quick-fire guns, while the Esmeralda carries 6-in., and the cubes of 4 and 6 are 64 and 216. Other considerations come into play, though in a less degree. The velocities are not quite the same, and the 4-in. gun fires more quickly than the 6-inch. Further, the number, as well as the calibre, of the quick-fire guns in the Elswick cruiser gave her a great superiority. The total results of all these effects is broadly shown in the diagram, and the most telling element is the difference in calibres of the guns, a difference which it is hardly likely that the United States authorities will allow to continue for long.

The object now in view is to discuss some of the elements which tell in actual war, but which cannot be dealt with in tables or diagrams, and which have not yet been tested as to their scope and power in any serious sea-fight. It is interesting to consider how far

we know the effects likely to be produced by such untried elements. Although it may be difficult to offer more than conjecture, yet the attempt will be useful if it leads any officers to form their own conception of the probable conditions more completely, and to shape definite plans to pursue in the hour of trial.

Scope of fire and interference.

If the diagrams of total energies of fire are to be practically applied, the first modification that suggests itself is a correction based on the proportion of the guns that can be brought into action simultaneously against the same object. When ships engaging in action are constantly changing their relative positions, the advantage of the complete independence of each gun is very great. A ship possessing this advantage encountering one whose gun detachments are liable to be called upon to cease fire at any instant, or to suffer considerable shock and injury from the fire of adjacent guns, has been likened to an athlete fighting with an encumbered man. The recent firing trials of the Indiana showed that in certain positions the guns interfered with each other. In her case such positions were extreme ones, and the movement of the guns into such positions might be prevented by limiting the arc of training. Such a step appears to be desirable, for it can hardly be doubted that in action every gun commander would fire at the enemy whenever he found it possible; and if the damage and disturbance resulting from firing in a line passing close to other gun positions is too great a price to pay for the power of so firing, the possibility should be removed. The Indiana would then be free from the complications arising from interference, though the scope of fire would be somewhat diminished. In certain French ships the evil of interference exists to a large extent, while British ships are singularly free from it. In French battleships of the last decade it has been the rule to mount the four heavy guns in four armoured positions, two on the centre line, two on the broadside, the object being to secure powerful fore and aft fire. In the Magenta class and in the Carnot, it is probable that the firing of the heavy broadside guns nearly in line with the keel would either damage the ship's structure, or at any rate seriously disconcert the crews of some of the secondary guns. In the cruiser Dupuy-de-Lôme the effort to develop end-on fire has produced undue crowding and possible interference of guns. In British battleships the heavy guns being mounted in pairs on the centre-line of the ship do not interfere with the secondary armament.

Main armament.

In a modern man-of-war the armament comprises three classes. First, there is a main armament of strongly protected heavy guns, which alone possess the power to attack the vital parts of an enemy by what is termed "belt attack," and to inflict mortal wounds.

This class of fire is comparatively slow, and the number of blows struck comparatively few. Ships will be seldom so close to each other, and the enemy's armour presented so fairly to the guns, that the belt can be perforated, and one or other of the combatants sunk or disabled. Armour-piercing shells carry such small bursting charges, and their action is so uncertain, that shot will probably be preferred when the armour to be attacked is thick. The explosive effect of common shell from the primary guns would be enormous, but, as such projectiles cannot penetrate a belt, they would probably only wreck the structure in places of secondary importance. It may be questioned whether they would inflict damage equal to the more distributed effect of a few smaller shells. Certainly the fire of the heavy guns would compare less favourably with that of the lighter guns when the structure attacked is light. A heavy shell must tell best by shattering parts which are too strong for the lighter ones. A barbette gun, conning tower, or a mast might be brought down by a very powerful shell, but it is a possibility which could not be reckoned upon. For disposing of an enemy in a limited space of time, most captains would probably depend more on their secondary armament than on their heavy guns.

Secondary armament.

The secondary armament takes a very distinct shape in British battleships. In the Majestic class it consists of twelve 6-in. quick-fire guns mounted in armoured casemates. Taking the rates given in the *Annual* for 1896, these guns deliver per minute 214,784 ft.-tons energy, as compared with 101,820 ft.-tons delivered by the four heavy guns. It may generally be expected, however, that the whole of the heavy guns would be able to fire, while only half of the 6-in. could do so. Consequently, the available striking energies may be considered equal, but these would be made up of three blows from the heavy guns and thirty-two from the 6-in.; so that while the former offer the greatest possibilities, the latter provide a form of injury that can be safely reckoned on. These guns would make what is termed "shell attack." They might possibly discharge armour-piercing shells, but, as may be seen presently, it is more probable that they would be ordered to attack with common shells, perhaps charged with high explosive.

Light quick-firers.

The third division of the armament consists of light quick-firers, which, in the latest British ships, are 12-pounders and 3-pounders. These guns were originally designed to defeat torpedo-boat attack. In action with a battleship, the comparatively small energy and small bursting charge of their shells would limit the injury that they could inflict on the ship's structure. On the other hand, they would sweep down any men exposed to their fire in a terrible way, provided that

they were not themselves overwhelmed by the enemy's fire. Though small shields are provided in most cases, it is easy to conceive conditions of close action when men could hardly stand at certain pieces for a minute without being shot down. The course to be pursued by a captain as to these guns has never been laid down, hardly even discussed. It must be left to his discretion; nevertheless, it ought surely to be recognised that in certain circumstances it may prove, if not impossible, a great mistake to man them. No lessons on this point can be drawn from actual warfare. Although some quick-fire guns were employed in the battle of Yalu by the Japanese, and did in a measure display their destructive powers, they were not acting under the conditions that may be anticipated in future. The Chinese had hardly any of the auxiliary batteries which quick-fire guns are specially powerful to destroy, and the Japanese small quick-firers were not exposed to the fire that must be expected to attack such pieces in future battles. A badly aimed Chinese gun discharging a steel armour-piercing shot, because it was unsupplied with common shell, constituted an attack singularly unsuited to injure unarmoured batteries.

Guns in tops.

The 3-pounder or other light quick-fire guns in the tops are in a different position from those on deck. Any artilleryman knows how difficult it is to hit an object in the air with no opportunity of seeing how near a previous shot has passed. The mast, however, is comparatively easy to hit. No positive opinion can be expressed as to the amount of shell-fire needed to cut it down, in the face of contradictory statements made as to this matter at Yalu.

Ships under fire.

Charlemagne.

Let us now consider the elements we have been discussing in connection with the attack of some armoured ships of modern type, referring to the plates given in Part II. In the case of the Charlemagne, it will be seen that the heavy turret guns are protected by 15¾ inches of steel, and are fairly supported by armoured structure below. These, then, are safe from any attack except from the heaviest guns. On the other hand, the secondary batteries are protected by only three inches of steel, and beneath them there is no armour at all. It follows that they are open to destruction in every form by common 6-in. shells; and the Charlemagne, with the exception of her belt-protected part and her turret guns, might be reduced to a floating ruin, though she would naturally reckon on forestalling this fate by the destruction of the enemy by her fire.

Majestic.

All ships are not vulnerable to common shell-fire to this extent. In the case of the Majestic class it would be difficult to injure not only the barbettes, but nearly all the secondary battery of 6-in. quick-fire guns. These are mounted in casemates, and protected by

six inches of hard-faced steel and with 9-in. armour beneath them. It would need so severe and direct a blow from an armour-piercing projectile that it is unlikely that any enemy could injure them severely, except with her heaviest guns. Common shells with light explosives might destroy the structure round them, but the closed casemate would keep out the gas and fragments, so that neither men nor structure would suffer so far as the secondary battery is concerned. Protection here exists to the maximum extent attempted in a vessel of modern type, and though the French Tonnerre and the British Thunderer classes may be said to be practically proof against shell-fire attack, they possess no secondary batteries to be protected. The Royal Sovereigns, which have only four 6-in. guns in casemates, the Renown, and the Canopus class, and some foreign vessels, resemble the Majestic in a greater or less degree.

Renown and Jauréguiberry.

Let us now suppose the Jauréguiberry to engage in action with our Renown. The latter has a displacement of 12,350 tons, against the 11,637 tons of the former, which is not a sufficient difference to prevent some comparison being made. How do these vessels stand in relation to each other, with regard both to attacking and defensive powers? The armament of the Jauréguiberry nearly corresponds to that of the Carnot. She carries two 12-in. and two 10·6-in. guns for the main armament, and eight 5·5-in. quick-fire guns mounted in pairs in four turrets. The Renown carries four 10-in. guns, and ten 6-in. quick-fire guns mounted in casemates. The energy of fire per minute of the Jauréguiberry is about 253,564 ft.-tons, and that of the Renown 251,323 ft.-tons. The French ship starts, then, with a slight advantage, but the estimate is far too rough to reckon on this being a reality, and, if it were, it would be swallowed up in any relative advantage either ship might possess in bringing her guns to bear on her adversary. The Jauréguiberry professes to bring a large number of guns—viz. one 12-in., two 10·6-in., and four 5·5-in. guns—to bear right ahead or astern, while the Renown could only employ two heavy guns and two 6-in. guns. On either broadside the Jauréguiberry can only fire three of her heavy guns and four of her secondary guns, when all the Renown's four heavy guns and five 6-in. guns would be available. The guns of the Jauréguiberry interfere with each other less than in the Carnot and most French ships. On the other hand, two of the secondary guns being mounted in pairs in lightly armoured turrets, are liable to be put out of action by a single lucky shot. In defensive powers the Renown generally resembles the Majestic class. Her four principal guns, mounted on the redoubt system, and six of her 6-in. quick-fire guns, are proof against common shell attack. Apparently such shells might

burst beneath the four quick-fire casemates on the upper deck. The light quick-fire guns are unprotected except by the small shields fixed on the guns. The scope for common shell attack, however, is very limited in the case of the Renown. On the other hand, the natural attack to adopt for the Jauréguiberry is that of common shell. It may well be questioned if the central tube under the principal gun positions would afford sufficient support to prevent the turrets being disabled by large shells exploding beneath them, and much less would suffice to wreck the armoured positions of the medium guns. Let two ships engage, one firing common shell with large bursting charges, with nothing to prevent their full effect, and the other armour-piercing projectiles, with only a doubtful prospect of driving in dead metal, and now and then a comparatively small bursting charge, and it follows that the chances are so uneven that the conflict has only to be prolonged for the latter ship to be destroyed. The Renown would no doubt be gallantly attacked; but it is only by the possible fortunate effect of one or two very large shells that her destruction is conceivable, and, seeing that these must be armour-piercing shells, the likelihood appears remote.

The Carnot may be taken in illustration of another French type. Carnot. Her fire is about the same in amount as that of the Jauréguiberry, already noticed. Her midship gun positions are protected beneath by 4-in. armour, which is far better than nothing. A common shell proper carrying a full bursting charge cannot be expected to get through more than half its calibre of ordinary steel, and certainly this belt of treated metal would entirely defeat the common 6-in. shells, so that these gun positions would only be subject to the attack of armour-piercing projectiles. The other positions appear to be open to the usual formidable shell attack, that is, to the entrance of common shell beneath them. Altogether, those who recognise the full power of shell attack proper, especially if high explosives be employed, will consider that the protection of French ships has been terribly sacrificed to the idea of a complete water-line belt. The crowding of the turrets of the secondary armament round the turrets of the heavy guns is a very serious disadvantage in the Carnot.

To pass on to types in other fleets. Suppose the Russian Sissoi Veliky to engage with the Italian Emanuele Filiberto. Their respective displacements are 8880 and 9645. Their energies of fire are 286,528 and 226,191, so that the Russian, though the smaller ship, has the superior fire. Both appear to be liable to interference in a certain measure; but it is not easy to speak definitely. When we look at their defensive powers, we are met by the curious circumstance

Sissoi Veliky and Emanuele Filiberto.

that the Italian ship has a complete belt, while the Russian depends on a horizontal armoured deck forward and aft, each ship being an exceptional one for the Navy to which it belongs. The usual characteristic of a Russian ship was until lately a complete belt, while the Italian constructors have discarded armour at the water-line more boldly than any others in their most notable ships. The Russian ship has much the thicker armour, but there is some opening for common shell to act under her turrets, and the Italian armour (9¾ in.) is sufficiently thick to make it impregnable to common shell. The Emanuele Filiberto has the advantage of two knots in speed, and altogether these ships might prove to be well matched.

Kearsage and Tria Sviatitelia.

As a final example let us suppose the United States battleship Kearsage to engage with the Russian Tria Sviatitelia (or Three Saints). Their relative displacements are 11,500 and 12,480 tons; their nominal speed is the same (16 knots.) The energy of fire of the Three Saints may be taken as the same as that of the Poltava, which apparently carries as nearly as possible the same armament. The fire energies per minute are: for the Kearsage 283,873, and for the Russian ship 383,851. The double-turret system adopted in the Kearsage is said to be condemned. If the upper turrets, which contain four 8-in. B.-L. guns, are removed, her fire will be reduced. On the other hand, it is difficult to believe that the Americans will long be content with 5-in. quick-fire guns for the secondary armament. The substitution of fourteen 6-in. quick-fire guns for the 5-in. would give an increase of energy per minute of 96,725 ft.-tons. The four 8-in. guns represent 21,363 ft.-tons only. Without, then, attempting to say what actual charges could be made, it is obvious that the ship's fire energy might easily be increased by adopting quick-firers of the calibres usual with other nations. For the moment she must be taken as she is given, with her double turrets and 5-in. quick-firers. Interference does not come in much with either vessel, supposing the double turret to act as intended. The Kearsage, then, has the advantage of eight heavy guns, available for engaging on either side, while the Three Saints has but four. The armour structures of both ships, while to some extent designed on the general plan of our British battleships, possess certain distinct peculiarities.

The Three Saints' secondary battery is protected by 5-in. compound armour, while the side beneath is protected by 16-in. armour, in the same way as our Nile and Trafalgar. The hull, then, is very strongly protected. The upper quick-fire guns could be quickly destroyed by common shell fire; but the 6-in. pieces behind the 5-in. armour could only be attacked by armour-piercing shells, so far as the 5-in. quick-fire guns of the Kearsage are con-

cerned; indeed, if the plates are hard-faced, which is unlikely, it may be questioned if the American 5-in. guns could even drive shot through. The 16-in. and 18-in. armour would call for direct and powerful blows from the Kearsage's heaviest pieces, and it would probably be best to fire heavy common shell at the secondary 5-in. armoured battery, supposing it not to be hard-faced. Taking it altogether, this ship would bear attack very well, though she would have been greatly strengthened by adding a little to the 5-in. plates at the expense of the thicker armour.

The turrets of the Kearsage are supported on armoured bases resembling the redoubt system adopted by us, and the secondary battery is so protected by 6-in. armour that quick-fire common shell is kept out of the most important parts of the ship. Nevertheless, as in the Three Saints, the 5-in. belt is a little too thin, although it probably has a hardened face. A common shell, as noticed before, generally perforates armour half its calibre thick; consequently the 12-in. guns might make a formidable attack all along this zone of the ship. The word "might" must be taken in its most uncertain sense, however, because there is no experience as to how hardened-faced armour behaves under these circumstances. Will the common shell break up uselessly, or will it drive out a disc very much as if the plate had no hard skin on it? Either result is conceivable. There is no sharp point such as the hard skin is specially calculated to defeat by fracture. All that can be said with any certainty is that six inches would have given great additional security. It is easy to demand more armour, and the natural question arises, Is there any armour not used to good purpose on this ship? Probably attention will be called by such an inquiry to the piece of belt running up to the bows. What is this protection rising so little above the water-line intended to do? If this part is attacked, it will be by common shell directed to burst as close as possible to the horizontal armoured deck. How will such attack be prevented by this low belt? It would probably stop some shell, but entrance would be possible to those passing above the belt. It prevents also a glancing blow on the deck. Seeing, however, that shells will generally be exploded as they enter the ship's side, it is difficult to conceive of a severe glancing blow, and the use of this low belt seems questionable, unless the ship were to use her ram repeatedly, which is not a likely contingency. Altogether, it appears as if the Kearsage would be much improved, in both offensive and defensive power, if her upper turrets and the forward piece of belt were sacrificed in exchange for 6-in. quick-fire guns and an additional inch of armour. As she

stands, however, it appears as if she ought to bear heavy attack well.

Advantage of common shell fire.

It is needless to take other examples. The questions discussed involve many untried elements, and the data available are imperfect. It is hoped, however, that food for thought is suggested, and that officers could add much by studying the drawings of possible adversaries, and considering how to attack them and how to handle their own guns in each case. It is not supposed that guns succeed in striking the part of the ship aimed at except under favourable circumstances. A proportion of projectiles will, however, do so, and clearly it is necessary that this proportion should be such as will be suited to the work attempted. The broad fact which stands out most prominently is the enormous advantage offered by common shell-fire. Half a century ago this was felt when wooden ships existed. In the present day, high explosives and quick fire have come in to compensate for the introduction of iron structures, and armour of medium thickness, such as will defeat common shells, seems to be just now the element telling most in the defensive power of battleships.

C. Orde Browne.

CHAPTER VI.

The Limitations of Passive Defence.

Writing to the *Times* in July, 1891, Admiral Sir A. (now Lord) Hood laid down two propositions in regard to the principles of national defence. He then stated:—

1. "That our military ports both at home and abroad should be armed and garrisoned in such a manner as to render them . . . independent of the assistance of the Navy."

2. That so long as "the Navy is maintained at a strength equal to that of the two most powerful Navies combined . . . no fear, except under most extraordinary conditions, need be entertained of the attack of our first-class military ports at home by the enemy's fleets; but they will always be subject to the attack of the enemy's torpedo-boats and vessels within their limits."

"To the Army," therefore, he argued, we should "confide the protection of the whole of our ports;" and although the desirability of change in this respect has frequently been mooted, the Army continues to undertake the responsibility of fortifying, garrisoning and maintaining all the protected harbours and anchorages in Imperial charge with the single exception of Ascension.*

The two propositions thus laid down by an eminent late First Sea Lord are technically indisputable. They do not, however, go to the root of the matter, and in one important respect they are open to grievous misunderstanding. The measure of the probability of attack upon our sea-board at home and abroad depends absolutely upon the power which an enemy can exert at sea. The necessary standard of garrisons, armaments and fortifications of our ports is—or should be—ruled by a single consideration. "What can an enemy's Navy be reasonably expected to attempt at sea, over and above maintaining its contest with the Naval strength of Great Britain?" is the question by the answer to which the whole policy of the Empire in relation to passive defence ought to be regulated. Since the only force which can possibly limit and control the operations of hostile

* A small garrison of Marines was also formerly maintained by the Admiralty in the Falkland Islands. Esquimalt has a small permanent garrison of Marines provided at the expense of Canada.

fleets at sea is the Navy, it follows that the *rôle* which the Navy is prepared to play dictates the scale of the measures of passive defence. The correctness of the above reasoning, which is purely based upon elementary common sense, would not now be disputed; but the whole case is not yet presented.

A country self-contained, or certain of being supplied overland through the territory of a friendly neutral, might perhaps be justified in making great efforts for the passive defence of its coast-line. This, rather than preparing to meet an enemy's fleet at sea, might possibly be its wisest, most effective, and most economical policy. Such may have been the condition of England in the past, although history conclusively proves that at no period until 1859 did a policy of passive defence find favour. Now, however, the conditions have undergone total change, and the British Empire is absolutely dependent upon security of maritime communications. Thus, as was pointed out in 1888 by three distinguished Admirals, including the present and a late First Sea Lord, "it would not require the landing of a single man" upon our shores to bring about an "ignominious capitulation." "By her Navy," they significantly added, "England must stand or fall." No one at the present moment dares to question the truth of this statement, deliberately made by Sir W. Dowell, Sir R. Vesey Hamilton, and Sir F. Richards. Unfortunately, an axiom may be accepted without any clear understanding of what is implied, and it is necessary to carry the matter a step further.

If, from any cause, the Navy fails to hold its own at sea, as did that of Holland in 1652–54, and of France in 1756–63, and again between 1793 and 1814, passive defences, with all their many adjuncts, will be wholly unavailing to uphold a cause already lost. They do not constitute, therefore—for the British Empire—a second, third, or any other line of defence, but are required solely as a means of protecting exposed Naval or national resources against the destructive effects of light raids, which might be carried on by an enterprising enemy behind the back of a Navy, however powerful and successful.

For reasons vital to the existence of the Empire—for reasons, therefore, apart from all questions of territorial security and of coast defence—the Navy must be rendered able to hold the seas against any reasonably probable combination of Naval Powers. Territorial security and effective coast defence, if attainable by men and armaments on shore, might suffice for the needs of some countries. For the British Empire, as the Committee of Admirals in 1888 plainly declared, this condition is not only insufficient, but perfectly compatible with national collapse.

The greater includes the less; the supreme necessity of the Empire overshadows the lesser need. If the one is provided for, the other ceases to be a legitimate cause of anxiety. So long as the Navy can control the operations of an enemy at sea, the national harbours and coast-lines will receive the best possible protection.

Thus, when Sir A. Hood demanded, in 1891, that our ports at home and abroad should be rendered "independent of the assistance of the Navy," it is clear that direct assistance is implied. A Navy operating freely at sea covers its national ports exactly as a powerful invading army guards its base, but more effectively. Simple as this proposition appears, and wonderfully as its sterling truth is attested by history, the extremely important principle embodied has been generally ignored. There is a widespread tendency to separate the duties of the Navy into three distinct spheres—the blockade or observation of an enemy's squadrons, the protection of the coast-line, and the defence of commerce afloat. These functions are then assumed to be cumulative, and stress is laid upon the difficulty which the Navy would experience in accomplishing all simultaneously. If successful in one sphere, it is suggested that the Navy might fail in another, and, as there is a prevailing belief that an enemy's ships—never our own—can be in two places at the same time, the result is a luxuriant crop of verdant fallacies.

Quotations could be almost indefinitely multiplied to illustrate the mental obscuration thus induced. Writing in 1845, the Duke of Wellington stated: "I apprehend that the territorial extent and the influence of the British Empire would be very limited indeed if the Naval force was required to guard the coast." The assumption here is evidently that, in order "to guard the coast," the Navy must always remain within hail, and that the discharge of wider Naval duties would necessarily leave our shores wholly unguarded. Nearly forty years earlier, in days of war, the Duke had fully recognised that a vigorous offensive by sea and land was the most certain means of obtaining territorial security.

The Defence Committee of 1880 pointed out that, "with the exception of submarine mine defences, the mercantile ports are entirely dependent on H.M. Fleet for any degree of security against attack." Here the parlous state of ports protected by a sea-going Navy is made a plea for fortification; and it does not seem to have occurred to the Committee that the Navy, if able to afford reasonable security to commerce moving to and from the Irish Channel, must, *ipso facto*, provide a large measure of effective defence to Liverpool and Cardiff. If a mercantile port is to be of any value in war, its sea approaches must be guarded, and can only be guarded, by the

Navy.* If the approaches are so guarded—and the means of existence of the masses in this country depend entirely on the fulfilment of this condition—then is the port—the very questionable employment of submarine mines apart—not defenceless.

Similarly, Sir Charles Dilke alludes to the "wickedness of throwing upon our sailors the defence of fortresses that have been imperfectly armed," strangely forgetting that our sailors, in the ordinary discharge of their primary duties, cannot avoid defending those fortresses.

The fundamental misconception underlying these and many other statements of like nature is that a fleet has no defensive value beyond the *rayon* of its immediate operations, and that Naval warfare is a game of hide-and-seek, in which one player hunts vaguely for the other, who, till caught, is perfectly free to attempt anything that may suggest itself. On this hypothesis, a squadron which for a brief space has evaded a superior force may be expected to commit itself to the attack of a fortified port. A force declining an action at sea may nevertheless luxuriate in territorial aggression. A hunted cruiser may employ her respite in running into the difficult waters of the Mersey, betake herself to the long and intricate tidal channels of the Thames or the Clyde, or may enter the cramped waters of the inner harbour of Singapore, commanded by guns which would destroy her in ten minutes. A fleet of transports crowded with helpless troops may risk a voyage on the off-chance of escaping detection. And, generally, a Navy, which has neither obtained supremacy at sea nor evinced any readiness to fight for that supremacy, may yet embark on a policy of pure adventure, and, while unable or unwilling to accept battle on its own element, may devote its energies to purposes for which ships are not constructed. On such assumptions as these a great part of our national policy has been based for nearly forty years. They are, as a rule, implied rather than stated, since if nakedly revealed they might outrage common sense.

The Royal Commissioners of 1859, however, frankly placed the inutility of the Navy in the forefront of their Report, and, having eliminated the main factor of Imperial defence, proceeded to make recommendations admirably adapted to an England which could in war dispense altogether with maritime communications. It followed that the rejoinder to fortifications across the Channel took the peculiarly inappropriate form of similar measures on our own shores, and that the Navy ceased for a time to have any defensive value in public estimation. Guns on shore came to be regarded as the natural

* "Of what use to adventure the trade of the Universe, if the riches brought from such a distance are to be intercepted within sight of their destination? . . . To be masters of the North Sea, the Baltic, and the Channel is to be masters of the whole commercial situation."—*Admiral Jurien de la Gravière.*

opponents of ships at sea, and it was tacitly assumed that an enemy's fleet would at the outbreak of war devote itself to an attack upon our coast fortifications, which must therefore be supplied with every refinement which science could suggest.

Neglect of the Navy naturally followed, and a period of national peril—little realised—supervened. The restoration of the Fleet has at length been accomplished, and how the Navies of any two Powers could now find means to neutralise our Naval strength and at the same time to undertake coast attacks defies explanation. Difficult and intricate as may be the operations of Naval warfare, they are, in our case, ruled by a single simple consideration. A State which must hold the command of the sea or perish has only one rule of Naval policy in war—its fleets must blockade or observe those of the enemy. Blockades will be often difficult and generally unnecessary. What is required is that touch should be maintained with an enemy's squadrons, and that a superior force should be held in readiness to follow so soon as they quit shelter.

To be prepared to fulfil this condition is the primary requirement of Imperial policy. There is no difficulty, provided that recent efforts are not slackened and that the present temper of the nation undergoes no change. According to the latest Admiralty Returns,* the total tonnage built and building of the warships of Great Britain and of "the two next most powerful Navies combined" stands in each class as follows :—

Class.	Great Britain.	France and Russia.
	Tons.	Tons.
Battleships	634,510	504,971
Armoured Cruisers	137,250	142,985
Armoured Coast-Defence Vessels. .	58,430	90,366
Protected Cruisers	484,625	155,329
Unprotected Cruisers	44,290	31,149
Torpedo Gun Vessels	27,840	22,940
	No.	No.
Destroyers	90	5

These figures are susceptible of much analysis and are capable of various interpretations, according to the predilections of the individual. All our battleships and all our cruisers are naturally not equal to the best of those of others Powers. We have vessels indifferently armed and protected, or wanting in speed; so have they. A recent writer is able to suggest "doubt whether the British Navy is after all the first in the world or the last," and in other quarters an unreasoning

* August, 1896.

pessimism finds expression. The rehabilitation of a great fleet cannot be effected in a few years, and serious effort did not begin till 1889. Much still remains to be accomplished, and the present Board of Admiralty may be trusted to carry out the national behest. If, however, full allowance is made for deficiencies which are certainly not a monopoly of the British Navy, the above figures cannot be robbed of all significance. It will be found perfectly impossible to arrange any rational plan of campaign which would give to the two next greatest fleets, or their equivalent, a margin of Naval strength available for territorial attacks.

British cruisers must, in war, be largely dispersed over the waterways of the world, some being employed in hunting down commerce destroyers, others in patrolling the waters where trade routes necessarily converge. The discharge of these duties would make heavy demands upon the Navy; but the cruisers thus employed would evidently afford a large measure of individual protection to every Imperial port, without any withdrawal from their proper duties. In guarding commerce afloat, they necessarily guard the harbours from which it issues.

There remain the battleship fleets which are not likely to be despatched to distant seas. Great Britain would have no object in sending her battleships beyond the Mediterranean and home waters unless an enemy adopted this course, in which case he would be followed, and there would be no consequent loss of relative strength. Here, again, it is impossible to plan arrangements which will give an enemy the means of undertaking coast attacks. He must first obtain great victories at sea—victories so crushing and decisive as to leave him with an ample Naval preponderance to devote to purposes for which ships are not intended. The Nile and Trafalgar were sufficiently decisive; but, in both cases, the victorious fleets were incapacitated for engaging the most moderate defences on shore. Thus the old and tried policy of making an enemy's ships, wherever they may be, the Naval objective—a policy now far more than ever essential—precludes the possibility of serious attacks on our coast line.

The necessity for providing against raids carried on behind the back of the Navy remains. Such raids were rare in the past, and their probability has certainly not increased. The risk to the raider is now greater than ever; and the lessons taught by Sir Sidney Smith's attack with the Pompée and two frigates on a wretched two-gun battery at Cape Licosa, by the two 18-prs. and one 12-pr. which repulsed the Fortitude and Juno in the Gulf of San Fiorenzo, and by the Wasp and Telegraph batteries are by no means obsolete. A modest

number of effective modern guns well mounted and manned and kept in full readiness will suffice for the needs of any British port; half a dozen would in most cases be an ample provision. Against torpedo-boat raids, special measures are necessary in some waters; but it is already becoming recognised that the torpedo-boat menace can best be abated on the sea, and our ninety destroyers cannot be left out of calculation. Neglect of the plain teaching of history, the disastrous Report of the Commission of 1859, and failure to realise that the Navy, if able to guard the seas, must necessarily provide effectual protection to harbours, are the principal causes of the amazing development of our passive defences.

The responsibility for the safety of our ports having been entrusted to the Army, it was natural that the dominating Naval factor should have dropped out of sight. This responsibility was felt to be serious. To meet it, all the resources of science must be brought to bear, and the soldier readily credits the ship with powers which she never did and never will possess. To the imagination of the public, which is unaware that, during a century of great wars, the need of coast defences was not experienced, fortifications forcibly appeal. It may almost be said that fortification impresses the general observer in proportion to its unfitness for the purposes of war. Moreover, for some years, the concentration of effort upon passive defence blinded the nation to its Naval needs, and induced a perilous weakening of the fleet. Thus it was possible to argue that, since the Navy was palpably unequal to the task of commanding the sea, the coast defences must be increased accordingly, and policy thus fell into a vicious circle. So long as national defence was divided into separate elements, each being dealt with apart from the rest, the above conditions were inevitable.

The nation has at length been effectually awakened to a sense of its Naval needs. The facts that fortification does not supply the place of fighting ships, and is required only in an extremely moderate form if the primary necessity of the Empire is fulfilled, are beginning to be recognised.

At a meeting of the British Empire League, held at the Guildhall on the 3rd December last, the Duke of Devonshire laid down the broad principles of the national policy of defence in the following significant words:—"The maintenance of sea supremacy has been assumed as the basis of the system of Imperial defence against attack from over the sea. This is the determining factor in shaping the whole defensive policy of the Empire, and is fully recognised by the Admiralty, who have accepted the responsibility of protecting all British territory abroad against organised invasion from the sea. To

fulfil this great charge they claim the absolute power of disposing of their forces in the manner they consider most certain to secure success, and object to limit the action of any part of them to the immediate neighbourhood of places which they consider may be more effectively protected by operations at a distance. It is recognised, however, that Her Majesty's ships, engaged in hunting out and destroying an enemy's squadrons, may not be in a position to prevent the predatory raids of hostile cruisers on British ports. . . . . . But it is in the highest degree improbable that this raiding attack would be made by more than a few ships, nor could it be of any permanent effect unless troops could be landed. In no case could a greater force than a few thousand men be collected and conveyed without such arrangements as would bring the operations under the category of those which the Navy has undertaken to prevent."

The principles thus authoritatively laid down denote return to an ancient faith. "Attack from over the sea" is to be provided against by the only possible means—"the maintenance of sea supremacy." This is to be again the "basis of the system of Imperial defence," and, although the Admiralty does not specifically undertake the protection of home ports, this is evidently included in the "system," since the enormous convergence of trade upon those ports entails a powerful assertion of "sea supremacy" in neighbouring waters. Home ports can, in fact, count in a special sense upon Naval guardianship, which explains their immunity from attack during many centuries. In future, passive defence will, we may assume, be rigidly restricted to the denial of certain waters to "hostile cruisers," which must necessarily be "few" in number, and beset by risks and difficulties. The unbroken records of a thousand years of our history will be accepted as guides of policy, and national effort, instead of being frittered away upon objects of no importance, will be concentrated, as it has been in every great war, upon the maintenance of supremacy at sea, and the provision of fighting forces organised and equipped for action beyond the Naval frontier.

G. S. Clarke.

CHAPTER VII.

THE NAVAL AND MILITARY FORCES OF AUSTRALIA.

HAVING had the opportunity of personally visiting the various Naval and military establishments of three of the Australian colonies during the past year, the following account which is reprinted from the Proceedings of the Royal Colonial Institute by kind permission of the Council would not seem out of place in the *Naval Annual*.

It is interesting to note that the nucleus of the garrison for the coaling station of Esquimalt, which was visited on the way to Australia, is furnished from the Royal Marines, but is paid by the Colonial Government—the only instance in which this system obtains, though for reasons which will be given later on, it might be usefully imitated in the case of Thursday Island and King George's Sound.

Victoria.

The Naval forces maintained by the Colony of Victoria include the turret ship Cerberus, which is still armed with her old 10-in. muzzle-loaders. The similar ships, Magdala and Abyssinia, which are stationed at Bombay, have been re-armed with 8-in. breech-loaders. Besides the Cerberus there are two first-class torpedo-boats, the Childers and Countess of Hopetoun, and two small second-class boats. The gunboats Albert and Victoria have been sold. The wooden line-of-battle ship Nelson is still kept in commission, and is used as a barrack ship. The *personnel* of the Victorian Navy now consists of 177 men in the permanent force (reduced from 232), and of 152 men in the Naval Brigade or Naval Reserve (reduced from 342)—a total of 329 men. The complements required for the Cerberus and the torpedo-boats only amount to 232 men, so that the margin is ample. The torpedo depôt is in excellent order, and the torpedo-boats are frequently exercised at steam tactics and in running torpedoes. The Cerberus is also in good condition. The *personnel* is, on the whole, good and efficient; but the reduction in its numbers, as well as in its pay, in common with other branches of the public service, and the consequent uncertainty as to the future, must tend to have an adverse effect on efficiency.

Upwards of £900,000 have been spent on fortifications and their

armaments by the Colony of Victoria. Port Philip, like Port Jackson, has been made one of the most strongly defended ports of the Empire. The entrance is narrow, and a vessel must pass for several miles along a channel commanded on both sides by the guns in the forts; mining defences are also provided. The forts are manned by 288 Permanent Artillery—a very fine corps—who would be supplemented in war time by 675 Garrison Artillery Militia, a large proportion of whom are recruits. The total military force of Victoria, including the above, numbers about 5000 men, of whom 2985 are militia, 775 are volunteers in the Victoria Mounted Rifles, and 899 are in the Victorian Rangers.

New South Wales.

In New South Wales no ships are at present maintained by the Colonial Government. There are two partially paid Naval forces, the material of which is good. The Naval Brigade consists, for the most part, of ex-seamen, whose duties in case of war would apparently be to assist in manning the forts. The Naval Artillery Volunteers would man the torpedo-boat. The guns in the defences of Sydney Heads are mounted at a good height above the sea, and are well distributed. I must leave it to experts to say whether Sydney or Melbourne is the more strongly defended. The permanent forces of New South Wales include over 600 artillery and a few submarine miners. Besides these there are 800 cavalry, 500 artillery, and 2500 infantry—either militia or volunteers. The peace establishment of the New South Wales forces is nearly 6000 men.

Queensland.

The Queensland Navy includes two gunboats of 450 tons, manned by the Naval Brigade. The actual strength of the military force is over 3500. The permanent artillery number only 174. The strength had been so much reduced that it was impossible to provide reliefs for the garrison of Thursday Island, and to maintain it at its proper strength. Steps have recently been taken to remedy this evil. A battery of garrison artillery militia is being raised at Cairns.

South Australia.

The South Australian Navy possesses one heavily armed little cruiser, the Protector. The permanent crew only numbers seventeen, including officers, the complement being completed from the Naval Brigade. When my father and I went on board, the ship was under weigh. We steamed out to sea, dropped a target, and gunnery practice was gone through while steaming at the rate of 7 or 8 knots. Though the bulk of the Naval Brigade men had only been on board a few days, the practice was in most cases extraordinarily good. We were very much struck with the efficiency displayed, which reflects very great credit on Captain Creswell. At Largs Bay there are small forts, the main purpose of which appears to be to protect Adelaide from bombardment. The military forces of South Australia

have recently been reorganised, and now comprise about 1200 men. The number is small, having regard to the size and population of the Colony. By the Act passed in December, 1895, every male inhabitant of the Colony between the ages of eighteen and forty-five is liable for service; and the military forces may be called upon to serve in any part of Australia and Tasmania.

Western Australia.

In Western Australia the military force is small. The garrison for the defences of the important coaling station of King George's Sound—which must be the base for the cruisers protecting the trade approaching Australia *viâ* the Suez Canal or the Cape of Good Hope—is much below the required strength. Part of the garrison is to be provided by South Australia, but the growth of Western Australia should obviate the necessity of this inconvenient arrangement.

Tasmania.

The military force of Tasmania only numbers 800 efficients, and does not seem to be in a very healthy state.

Naval forces.

To sum up. It may well be doubted whether the money spent by the Colonies on their local Navies is in all cases well spent. In South Australia the Protector is so cheaply maintained that the expenditure is justified. In Victoria, owing to the large extent of open water inside the defences at Port Phillip Heads, it is desirable that there should be some floating defence for Melbourne. The Cerberus and the torpedo-boats are sufficient for the purpose, and would probably act as a greater deterrent to hostile cruisers than the forts at the Heads. They could be kept available for emergencies with a very much smaller expenditure on permanent staff. It is not clear what service the Queensland gunboats could render in case of war.

Military forces.

The military forces at present maintained are, with some exceptions, insufficiently trained, and are unprovided with equipment to enable them to take the field. The militia and volunteers, who constitute the bulk of these forces, have only a few days' continuous training during the year. Even the camps of exercise, which do so much to promote the efficiency of both officers and men, have been often abandoned in these bad times. There is plenty of good material in the Colonial forces, but it certainly needs to be better trained and properly equipped. Though some steps have been taken in this direction, the Federation of Australia is especially necessary for the purpose of defence. Were Australia federated, it should be possible to effect considerable economies in the permanent staff, and at the same time to obtain greater efficiency.

Australian Auxiliary Squadron.

Against a serious attempt at invasion the defence of Australia rests on British fleets many thousands of miles away. Against attacks on commerce and raiding expeditions (viz. two or three cruisers and one or two transports with troops) the best defence is an active Naval

defence. This is partly provided for by the Australian Auxiliary Squadron, which, by an agreement entered into in 1887, is equipped, manned, and maintained at the joint cost of the Imperial and Colonial funds. The squadron consists of five cruisers and two torpedo-gunboats, three cruisers and one gunboat being always in commission, and the remainder in reserve. The cruisers are satisfactory little vessels of their type, and well fitted for their work, except on the southern coasts of Australia, where larger and more powerful vessels are needed. The torpedo-gunboats belong to a class which is singularly ill-adapted for service on the Australian Station. The contribution paid by the several Colonies under the agreement is £126,000, £35,000 being supposed to represent interest on first cost, and £91,000 being for maintenance. A reference to Vote 16 of the Navy Estimates shows that, in addition to the £35,000, an annuity of £60,300 is paid by the British taxpayer. Though the agreement as regards the Auxiliary Squadron was only made for ten years, it will not terminate, except on notice being given by the parties to the agreement. In a recent speech delivered before the British Empire League, the Duke of Devonshire said: "I may say that Her Majesty's present Government attach the greatest importance to the renewal in some form or other of that agreement. The terms are, of course, open to reconsideration, but that it should be renewed is a subject which, in our opinion, is of the highest importance, not only on account of the actual addition to our Naval forces which it provides, but also to a step towards a practical measure of federation for the purposes of defence—a measure of federation which, with the growth of our Colonies, may make available for Imperial Defence the whole resources of the British Empire."

T. A. Brassey.

CHAPTER VIII.

Principles of Imperial Defence.*

We are met to-night under the auspices of the Imperial Federation League of Victoria. The Imperial Federation League of the United Kingdom was dissolved two years ago. Many members of the League in the United Kingdom, and, probably, a majority of the members of the branches both in Canada and here in Victoria disapproved of the dissolution. Experience has shown that it was amply justified by the circumstances. To devise a scheme of political federation was outside the scope of an irresponsible body of men however representative. All the work that it was in the power of the League to accomplish in the United Kingdom, at any rate, has been done. Mainly through the efforts of the League a complete revolution of popular sentiment has been effected. The idea of the old Manchester School that the colonies were a burden on the mother country, and hould be cut adrift at the earliest possible opportunity, has completely died out. With few insignificant exceptions, statesmen, politicians, and pressmen of all shades of political opinion, are looking now to the maintenance of the Union under one flag of the various communities which make up this Empire. Is not the sentiment of unity stronger in Canada, South Africa, and Australasia to-day than it was ten years ago? When we were threatened on the one side by the President of the United States, on the other by the Emperor of Germany, had the unanimous resolution of the Canadian House of Commons and the message of the Australian Premiers no significance? From all that I have seen and heard in a recent journey across Canada, and since I have been in Australia, I am confident that the sentiment of loyalty is infinitely stronger to-day than it was ten years ago. Nowhere is it more apparent than here in the colony of Victoria, a fact which may be attributed in great measure to the excellent teaching of geography and history in your State schools, just as I believe the hostility to Britain, which undoubtedly exists

* Address delivered at the Town Hall, Melbourne, before the Imperial Federation League of Victoria, 19th October, 1896, to commemorate the battle of Trafalgar. In these pages the address, which is based on a paper written for the *Nineteenth Century* in 1893, has been considerably abridged.—Ed.

among large sections of the people, especially in the central and western states of America, is largely due to the manner in which history is taught in the public schools.

Federation for Defence.

Because we cannot look forward in the near future to any form of political federation, it does not follow that there are not other ways in which we may draw closer the ties that bind us together. Some people believe that we can best secure the unity of our Empire by strengthening our trade relations. This view is largely held in Canada, especially by the party which has just been defeated in the General Election. It is also held to some extent in the United Kingdom by those statesmen and others who have banded themselves together into the British Empire Trade League, and more recently into the British Empire League. The idea of a Zollverein or Customs Union has apparently not found much favour in Australia, and there is no indication at present that the people of the United Kingdom are prepared to revolutionise the fiscal policy, under which the progress of the last sixty years has been achieved, in order to secure an advantage which in any case must be small as well as problematical. It is far more possible and of infinitely greater importance that we should be more closely united for the purposes of defence. Before we can come to any conclusion as to the part which each member of the British dominions ought to play in the defence of the whole, we must understand the general principles on which the defence of the Empire rests.

Defence rests on sea-power.

The main principle which I wish to lay down at the outset is that the defence of the Empire rests absolutely on our power to retain the command of the sea—in other words, on sea-power. I do not wish to minimise the functions which the army will have to perform in case of war, but I do wish to insist very strongly that no army which it is conceivable we could raise and maintain would compensate for inferior Naval strength.

In the year 1892–3 the gross cost to the British taxpayer of defending the Empire amounted to over £35,500,000, £20,500,000 of which was devoted to expenditure on the Army, and £15,000,000 on the Navy. To those who had grasped the principles of warfare which are applicable to a sea-power like Britain, it appeared that if the relative proportions of Naval and Military expenditure were reversed, the Empire would be better defended. The proportions of Naval and Military expenditure, though not reversed, have been entirely altered in the last four years. The Navy Estimates for 1896 amount to £22,800,000 gross, or £21,800,000 net. The Army Estimates amount to £20,900,000 gross, £18,000,000 net. It is impossible to deny that the British Empire is better defended to-day than it was

two years ago. We owe the change that has taken place to the fact that the principles of Imperial Defence are becoming better understood. The deepest gratitude of every Englishman is due to Captain Mahan, of the United States Navy, for so clearly setting forth those principles in his two admirable books.

I will endeavour to illustrate the assertion that the defence of the Empire rests on sea-power by considering the forms of attack which we may have to meet in case of war with a first-class European power, or combination of European powers. We shall have to meet attacks on commerce, attacks on colonies and dependencies, and, possibly, invasion. I have put them in the order in which they are likely to occur.

Attacks on commerce.

The *Jeune École* of French Naval officers has laid it down that in the event of war with England the Naval force of France should be mainly directed to the destruction of British commerce. The United States, it is true, were the first to lay down the type of fast and lightly armed cruiser, represented by the Columbia and Minneapolis, which have a trial speed of close on 23 knots. They are classed as commerce-destroyers in the American Navy List, and are commonly called in America "Pirates." France has followed suit by laying down this year two cruisers of the same class, the Guichen and Châteaurenault. We can only judge whether the policy indicated by the construction of such ships is likely to be successful in the future by the experience of the past. In the years 1756–60—that is, during the Seven Years' War—2500 British merchant ships were captured; and in the year 1761, 800 out of an estimated total of 8000 British merchant ships, or ten per cent., were captured by the cruisers or privateers of the enemy. Campbell, in his "Lives of the Admirals," says, "The trade of England increased gradually every year, and such a scene of national prosperity while waging a long, costly and bloody war was never before shown by any people in the world." In commenting on the results of the war of 1778, Captain Mahan says, "Especially is commerce-destroying misleading when the nation against whom it is to be directed possesses, as Great Britain did, and does, the two requisites of a strong sea-power—a wide-spread, healthy commerce and a powerful Navy. Only by military command of the sea, by prolonged control of the strategic centres of commerce, can such an attack be fatal. Such control can only be wrung from a powerful Navy by fighting it and overcoming it." In the great war which lasted from 1793 to 1815, the energies of the French Republic after the battle of the 1st of June, and of the French Empire after the Battle of Trafalgar, were directed to subjugating England through the destruction of her commerce. The total number of British merchant

vessels captured from 1793 to 1814 amounted to 11,000, but the number of ships belonging to Britain rose from 16,875 in 1795 to 23,703 in 1810. Captain Mahan estimates that the direct loss to the nation did not amount to more than 2½ per cent. of her commerce, and that this loss was partially made good by the prizes and merchandise taken by its own Naval vessels and privateers. On the other hand, the result of the war was fatal to the commerce of our opponent. Before the Revolution, Admiral de la Reveillère asserts that the foreign commerce of France equalled that of England. In 1799 the French Directory admitted "that not a single merchant ship is on the sea carrying the French flag." The history of the great war established, beyond contravention, the principle that no serious interruption to commerce is possible by the Naval forces of a Power which has not first obtained the command of the sea.

The British Merchant Navy holds a higher position to-day than it has ever done before relatively to the Merchant Navies of other countries. The aggregate merchant tonnage of the British Empire amounts to 10,512,272 tons, made up as follows:—

The United Kingdom	8,956,181
Canada	951,210
Australasia	359,614
British India	65,140
Other British Possessions	180,127
Total British Possessions	1,556,091

The aggregate tonnage of the Merchant Navies of all other countries amounts to 8,449,000; or, if we include vessels employed on lakes and rivers in the United States, to 10,305,000. Taking steamships alone, which are generally considered to possess three times the carrying efficiency of sailing ships, 6,377,000 tons sail under the British, 3,624,000 tons sail under foreign flags; or, including vessels employed on the lakes and rivers of the United States, 5,332,000 tons. Including only those vessels which ply upon the ocean, the British Empire possesses at the present time more than half the total merchant tonnage of the world, and nearly two-thirds of the tonnage of steamships. In any future war in which we may become involved, British commerce will undoubtedly suffer losses. Their number and extent will depend on the strength and efficiency of the British Navy. Judging from the experience of previous wars, the losses will almost certainly be more numerous, but they should represent a less percentage of the whole. If the command of the sea is lost, the ruin of British commerce is assured. It is idle for British merchants to talk of securing the safety of their ships under a neutral

flag. No Power with which we may be at war would respect the neutral flag where ships were carrying food supplies absolutely vital to the existence of its enemy. One hundred years ago England was nearly, if not quite, self-supporting; to-day we are not provisioned for more than a few months.

Attacks on colonies and dependencies.

Canada and India alone of British possessions are open to serious attack by land. British South Africa has a long land frontier, but no first-class Power could contemplate a serious attack except with troops transported over sea. The duty of repelling an attack on either Canada or India may depend primarily on the army, but our real power to defend them depends absolutely on the command of the sea. In event of war with Russia, we can put troops on the north-west frontier more easily than Russia can bring forward her invading forces. The contingency of war with the United States no Englishman likes to contemplate. Should Canada ever again be liable to invasion, our power to defend Canada depends, as in the case of India, on the power of transporting British troops by sea. Australasia, South Africa, Canada (except in the contingencies I have mentioned) are in a great measure secured from attack by their wide extent of territory and their numerous population. An army of 20,000 men would be required to conquer and hold any of these great colonies. Such an army cannot be collected and despatched across the ocean surreptitiously. To make the attempt while the command of the sea was in doubt would be madness. Attacks on commerce by cruisers keeping generally out of sight of land are the most probable form which operations of the enemy would take on the coast of India, South Africa, or Australia. Occasional raids on territory might be attempted by small expeditions, either with a view of obtaining supplies or inflicting damage. It is certain that few captains would waste ammunition on bombarding a seaport, with the chance of falling in with an enemy's cruiser before they could return to their base to obtain a fresh supply. Against such attacks the best defence is an active Naval defence by ships which are able to pursue and fight the cruisers of the enemy wherever they may be found.

Localisation of Australian Squadron.

In accepting the localisation of the vessels of the special Australian Auxiliary Squadron, we have acted on a principle universally condemned by students of Naval strategy, and seriously hampered their utility. I will endeavour to give an illustration to bring this home to the minds of everyone in this hall. You know that during the past fortnight British and Russian fleets have been watching one another through the Dardanelles. If the British Government had been influenced by the agitation raised in England, there is little doubt that we should have been at war with Russia, and

possibly with France as well, at this moment. The Naval force, maintained by foreign Powers in waters in the neighbourhood of Australia, whether in the Pacific or Indian Ocean, is absolutely insignificant compared to our own. In China the Russian and French Squadrons are equal, if not slightly superior, to the British Squadron.* They can oppose one battleship and five armoured cruisers to one battleship, three armoured cruisers, and a first-class protected cruiser. If the British China Squadron were to be defeated in battle, the command of the Pacific and neighbouring seas would be temporarily lost. British commerce would be interrupted, and Australia would be liable to invasion by Russian troops from Vladivostok or French troops from Saigon. The squadron now in Australian waters would be powerless to prevent it. I have no hesitation in saying that if the British China Squadron were immediately reinforced on the outbreak of war by the flagships here and in the Pacific, it would have a reasonable prospect of defeating, or at any rate of holding in check, the combined squadrons of France and Russia. There would most probably be a great popular outcry against any such action on the part of the Admiralty, but it is absolutely certain that the Orlando and Warspite would do more to defend the coasts of Canada and Australia in Chinese waters than they could ever do if they remained in Canadian or Australian waters. Against small raiding expeditions, accompanied by troops which are not likely to, but still might, escape our cruisers, you in Australia must be prepared to defend yourselves by maintaining a military force, not necessarily numerous, but certainly efficient, and capable of taking the field against disciplined troops.

Minor colonies and coaling stations.

Our minor possessions may be divided into colonies which have no local defences, and are dependent entirely for their safety on the Navy and coaling stations which have been provided with defences, and which are garrisoned by British troops. In the former category would be included most of the West Indies and Fiji, East Africa and North Borneo, Ascension and the Falkland Islands. Our most important coaling stations are on the two great trade routes to the East—on that *viâ* the Suez Canal, Gibraltar, Malta, Aden, Ceylon, Singapore, Hong Kong; on that *viâ* the Cape of Good Hope, Sierra Leone, St. Helena, Capetown, and Mauritius. In the West Indies we have Port Castries (St. Lucia) and Port Royal (Jamaica); in the North Atlantic Bermuda and Halifax; in the North Pacific Esquimalt (the defences of which are being completed), and here in Australia King George's Sound and Thursday Island. As long

* The withdrawal of the Russian battleship Nicolas I. from China to the Mediterranean in December of last year has altered the position.—Ed.

as we can retain the command of the sea, most of our coaling stations, being islands, are not likely to be attacked by more than a few cruisers. Against such an attack they are defended. Gibraltar and Malta alone are open to attack by a powerful force, because both are within easy steaming distance of European ports. Malta has long been the dockyard for the Mediterranean fleet. It is a moderately good base for operations in the Levant and for protecting the Mediterranean trade. The recent construction of a French Naval port at Biserta in Tunis has given it some additional importance. Gibraltar is situated at the most important strategic point in the British Empire. It is the base on which the fleet must rest, on which the safety of the British Empire mainly depends in the event of a struggle with the only Sea Power that can cause us serious anxiety. Of recent years it has been the practice of the French to concentrate their chief Naval strength in the Mediterranean. The French Northern Squadron, though it has been considerably strengthened since 1894, comprises only five powerful ships. A British Fleet resting on Gibraltar holds the interior position and has the power of fighting each of its opponents in detail, though we possess in our coast-guard and port-guard ships a fleet which should be fully capable of dealing with the French Northern Squadron. As many of our great Naval battles in the past (I will only instance St. Vincent and Trafalgar) were fought in the neighbourhood of the Straits of Gibraltar, so it is likely to be in the future. The Admiralty have, I am glad to say, at last recognised that for want of a better in the neighbourhood, Gibraltar must be made an effective Naval base. A sum of £2,674,000 has been voted in the Naval Works' Bill for the construction of three docks and for the extension of the mole which protects the anchorage. Both Malta and Gibraltar have powerful defences, and both are garrisoned by many thousands of British troops.

Dependence of fleets on coaling stations.

While we may assert that no local defence, whether in fortifications or men, will preserve coaling stations or colonies to a power which has lost the command of the sea, a Navy depends for its ability to operate in foreign waters very largely on coaling stations. Sailing ships could and did remain at sea for many months at a time. The period during which a modern ship of war can remain at sea is strictly limited by her coal-endurance, and by the necessity of effecting repairs in port to delicate machinery. The country which possesses the most numerous coaling stations, and the best situated as regards trade routes, will have a great advantage. In this respect the British Empire is without a rival.

Invasion.

If for the protection of our commerce, our colonies, and our coaling

stations, we depend in a great measure on our Navy, still more do we do so for defence against invasion. Large sums of money have been lavished on the elaboration of a system of defence for London and on the forts intended to protect Chatham and Dover against the attacks of an invading army. It would appear to be a sounder policy to prevent an enemy from landing than to take costly measures to meet him after he has landed. We are only gradually beginning to learn the lessons of our history.*

Our objective in war.

Having considered the three forms of attack to which we are exposed, we can form some opinion as to the ends to which our efforts should be directed in case of war. Our first and principal object must obviously be to defeat the enemy's main fleet in battle, and to completely checkmate his operations. An effective army, powerful fortifications, superiority in cruisers will not compensate for a deficiency in the line of battle. Battleships alone can give us that command of the sea which is indispensable alike to the safety of our commerce, our colonies, and the shores of the United Kingdom. Our second object must be to maintain a sufficient force of cruisers to deal with the hostile cruisers or privateers designed to prey upon our commerce, or with the expeditions intended to attack our colonies which might escape our principal fleets. We should always endeavour to deal with the latter at or near the point of departure rather than at their destination, for in this case the cruisers defend not only the point to be attacked, but the intervening ocean. Our third object should be to capture the coaling stations and colonies of the enemy, which are far more indispensable now than they were before the introduction of steam to depredations on commerce. During the Great War, French cruisers and privateers, issuing from Mauritius and the West Indian Islands, did us considerable harm. It was not till 1812 that all the colonies of France, Holland and Denmark had fallen before the British arms. Many millions of pounds would have been saved if we had seized Mauritius, Martinique, and Guadeloupe earlier in the war.

The army.

In view of the military forces now maintained by Continental Powers under conscription, the part which the British army can play in war with any first-class power, except Russia or the United States, is only a secondary one, but it is still important. With the assistance of the Navy it must lend its energies to the capture of the colonies and coaling stations of the enemy. The capture of St. Pierre or

* It seems unnecessary to repeat here the lessons to be drawn from Captain Mahan's account of Napoleon's celebrated attempt to invade England, though the Military Works Bill, recently introduced into Parliament, is an evidence that there is great danger of these lessons being forgotten. Expenditure is proposed in the Bill which cannot be justified on the principles set forth by Captain Mahan.

Réunion would not be great achievements for the British army, but the conquest of Algeria would test its powers to the uttermost. With Algeria hostile in time of war the trade route up the Mediterranean would never be absolutely secure and might have to be abandoned altogether.

Standard of strength.

It would be impossible to deal thoroughly with the question whether the Navy and army are sufficient for the duties imposed on them in our national defence. Not many months ago His Excellency gave an address on our Naval position in 1896. We are, I believe, just strong enough at sea to hold our own against a combination of any two other first-class Powers. Is our present standard of strength sufficient? We have to reckon with the fact that our very greatness, the splendid growth of our self-governing colonies under free institutions, the talent we have shown for the government of native races in Egypt and India, make us the most unpopular Power in the world.

The burden of defence.

Hitherto the burden of defending this great Empire has fallen almost exclusively on the inhabitants of the mother country. During the past two years we have added over £7,000,000 to our Navy Estimates alone, irrespective of £14,000,000 provided in the Naval Works Bill. In many of the colonies, certainly in the Australasian colonies, expenditure on defence has been cut down, and the tendency seems towards still further reduction. You have been passing through a period of severe depression. We in the old country have had a revival in material prosperity. The addition to the Naval expenditure has hardly been felt, certainly not by the general body of taxpayers. We have been able to hold our own well up till now against our probable enemies, but should those enemies become more numerous at a time when commerce and industry are not so prosperous as they are now, the British taxpayer may find the burden almost too heavy for his shoulders alone. Speaking as a representative of British working men, and putting it to you as purely an abstract question, is it just that we who live in the old country should contribute twenty times what you do to the common defence? Is it right that the sons and the brothers of British workmen should uphold the British flag in every corner of the world, while, if I am to judge from what I sometimes read in Australian newspapers, it is considered unreasonable to expect an Australian to serve anywhere except in defence of Australia? Though I am a member of the Imperial Federation Defence Committee; though I believe that it is well that we should turn these questions over in our minds, I certainly deprecate the tone sometimes adopted by members of the Committee in discussing this question. Believe me, Englishmen as a body

recognise that Australians as well as Canadians have done much for the defence of the Empire in the past. We do not forget that Melbourne and Sydney have been well defended at colonial expense. We do not forget the presence of the New South Wales contingent in the Soudan, a great object lesson to European nations of the unity of sentiment which animates all who live under the Union Jack. A contribution of £135,000 a year does not loom very large in Navy Estimates which amount to £22,000,000, but it is valuable as the recognition of a principle and as an earnest of what our colonies may some day be prepared to do. We shall not repeat the mistakes of the past. We do not and we have no right to expect that you will make any serious money contribution to the defence of the Empire until we are prepared to give you a constitutional voice in the control of that expenditure. That is impossible under our present constitution.

Colonial responsibility in future.

Looking to the future many people will be disposed to agree with Lord Rosebery that "in a full measure of devolution subject always to Imperial control lies the secret of the future working of this Empire." No nation has ever attempted to deal with such multifarious questions as we attempt to deal with in the House of Commons. It will be some years yet before we in the old country are able to draw the line between matters which are of Imperial, and matters which are of local, concern as they do in Germany and in the United States. A delay of one or even two generations will give an opportunity for the population and resources of the colonies to develop, and will place you in a position to enter into a political federation with the mother country on more equal terms. In the period of growth of her colonies, it is clearly the duty of the mother country to undertake the main burden of defence ; but when you no longer require such a large proportion of your resources for the development of your territory, it is not unreasonable to expect that the colonial taxpayer will be prepared to stand shoulder to shoulder with the British taxpayer in bearing the common burdens, and that colonial statesmen will be ready to take their place side by side with British statesmen in a parliament or council in which all parts of the British Empire shall be represented.

Australian responsibility now.

Meantime your task in the common defence is to see that the forts which make Sydney and Melbourne two of the most strongly defended ports in the Empire, and which protect Thursday Island and King George's Sound, are kept properly armed and efficiently manned. If the colonies wish to spend money on local Naval defences for their ports, keep the force which is to man them efficient and contented. The Cerberus would probably act as a greater deterrent to hostile cruisers than the forts at the Heads. More important than either

your forts or your ships are your military forces. You do not want a large force. What you have, let it be efficient, properly equipped, and capable of taking the field against disciplined troops. A small but efficient military force in these colonies would not only render you secure against any possible attack that might be made on your territory, but would also render valuable assistance in time of war by capturing the Naval bases of the enemy in neighbouring seas. In time of peace popular opinion is often impatient of military expenditure, and that is no doubt especially the case in these colonies, which have always been far removed from the strife of battle. Bear in mind the words of a well-known President of the United States, "A defenceless position and a distinguished love of peace are the surest invitations to war."

I have had unrivalled opportunities of seeing the British Empire. Let me say in conclusion that it is the highest ambition of my life to help to bind the colonies and the mother country more closely together, and whatever may be my political career, I can undertake that my best energies will be devoted to that object. This is no more than could be expected from the son of your Governor, who, at a time of life when many men are looking to rest from their labours, left his home and his children, who were settled round him, to serve his Queen and his country for the sake of the cause which we both have so much at heart.

T. A. BRASSEY.

CHAPTER IX.

NAVAL MANŒUVRES IN 1896.

I. ENGLAND.

General features.

THE British Naval Manœuvres of 1896 presented many features of unusual interest and novelty. In former years it has generally been the practice of the Admiralty not only to frame a complete scheme for the operations contemplated, but to issue beforehand a "General Idea" defining their characteristics. This practice was modified in several material respects in the manœuvres of 1896. In the first instance only "General Orders and Instructions" were issued, of which the following are the most important:—

(5) At the expiration of the preliminary cruise the ships and vessels of the Fleets will proceed to the ports indicated in the secret orders to coal and prepare for the Manœuvres.

(6) Instructions for the guidance of the Admirals and other officers in command, previous to and during the Manœuvres, have been issued, which will come into force at a date to be hereafter specified.

(7) The general character of the operations to be carried out in this year's Manœuvres is the watching of one Fleet in port by the Cruisers of another Fleet lying in readiness at a chosen anchorage, so that no opportunity may be lost of bringing the first Fleet to action, or of ultimately defeating the object it has in view before the expiration of the five days allowed for the exercise.

(8) The forces placed at the disposal of the Admirals in chief command of the opposing Fleets will therefore have to be combined and utilized by them in such a manner as to secure the accomplishment of the task allotted to each. No general idea of the Manœuvres will be issued beforehand, but the conditions, relative to the Fleets, which exist before the actual commencement of the Exercise will be made known to each Admiral separately, so that the measures they adopt and the dispositions they make will depend upon this knowledge, and the subsequent information they acquire from their own ships and Signal Stations.

(9) The superiority of either of two Fleets which meet will, if they are complete and intact in Battleships, be decided by the rules to be issued, but if not intact it will depend on the superior number of Battleships present in one Fleet. All Battleships will count alike for this purpose, and Cruisers will not affect the issue.

The analogies of war.

A list of the ships to be mobilized was issued at the same time and the composition of the Channel and Reserve Squadrons thus reinforced was indicated. But the mode in which the ships would subsequently be distributed by the Admirals "acting under the orders received by them," and the "ports indicated in the secret orders" were not made known beforehand—the intention manifestly being that the distribution should only be made after the original fleets had put to sea for the preliminary cruise, so that the Admiral in chief command on one side should not know beforehand the exact

distribution and station of the squadrons under the command of his adversary. The purpose of this procedure is sufficiently obvious. When war is imminent between two naval Powers each is likely to be generally acquainted with the naval strength and resources of its adversary, but not with the exact distribution of his fleets, still less with his strategic plans and intentions. It is probable that each would have several ships in actual commission, while others would be fitted out as expeditiously as possible. The strength and probable position of the fleets in commission would doubtless be known to each side from the outset. But some little time would elapse before either would obtain precise and accurate intelligence of the position and strength of the reinforcements preparing by the other. Each would endeavour to conceal the character and purpose of its own measures from the other. It is improbable that the fleets of either would move before war was actually declared, because any such movement would be regarded as a menace and might prejudice any negotiations which were still proceeding for the preservation of peace. But it is unlikely that any such restriction would be placed on the movements of cruisers. They would no doubt be freely employed on both sides to obtain without breaking the peace what information they could as to the dispositions and probable movements of the future enemy.

The situation at the outset.

A situation of the character indicated was established when the Channel and Reserve squadrons repaired to their appointed stations at the termination of the preliminary cruise. Each was divided into two parts, one to represent the fleet in commission, the other the reinforcements in preparation. Each Admiral in chief command knew where his immediate adversary was, but neither knew at the outset where the reinforcements were being prepared for the other side nor when they would be ready. Each was furnished with a series of sealed orders, and instructed not to break the seal before the date indicated on the cover. The instructions first opened after the fleets had put to sea for the preliminary cruise were found to be as follows:—

Rules and Regulations to be Observed During the Manœuvres of 1896.

The duration of "active operations" will extend over five consecutive periods of twenty-four hours from the time given in the telegram ordering the Exercise to commence, equivalent to a declaration of war, or commencement of hostilities.

The operations will take place in the following area:—between latitudes 49° and 56° N., and longitudes 2° to 15° W.

Within these limits all the coasts and ports of Ireland and Portland are friendly to the Fleet assembled at Berehaven, and all the coast and ports of Great Britain and Lough Swilly are friendly to the Fleet assembled at Milford Haven.

Coasts and ports friendly to one Fleet are hostile to the other.

The superiority of one Fleet over another will depend, unless otherwise ordered, upon

having a greater number of Battleships. Where Fleets have the same number of Battleships, no decisive result can follow their coming into action. Cruisers will not affect the issue; if one Fleet "meets" another, the inferior Fleet will be considered defeated, and must return to its base.

By "meeting" is meant that the Battle Squadron of the superior Fleet must remain within three miles of the other Battle Squadron for two hours; ships are not to be dispersed to avoid this.

Return to a base port involves the ships being anchored, but immediately after a Fleet may resume active operations.

All bases assigned to the respective Fleets for the operations, as well as Lough Swilly and Portland, represent secure fortified ports. No Fleet can be prevented from entering one of its bases when within twenty miles of the entrance, unless it is met by a Fleet superior in Battleships.

The following table will regulate the result of the "meeting" of various classes of ship:—

TABLE TO GOVERN SHIPS BEING PUT OUT OF ACTION.

NUMBER.	CLASS OF SHIP.	CAN PUT OUT OF ACTION.	AT WHAT DISTANCE (EXTREME).	IN WHAT TIME.
1	Battleship . . .	First Class Cruiser . .	1 mile	70 minutes.
		Other Cruisers . . .	1 "	30 "
		Smaller Vessel . . .	1 "	10 "
		Destroyer	½ "	3¾ "
		Torpedo Boat . . .	½ "	2 "
1	First Class Cruiser	Other Cruiser. . . .	1 "	50 "
		Smaller Vessel . . .	1 "	30 "
		Destroyer	½ "	5 "
		Torpedo Boat . . .	¼ "	2 "
1	Other Cruiser . .	Smaller Vessel . . .	1 "	40 "
		Destroyer	½ "	7 "
		Torpedo Boat . . .	¼ "	3½ "
1	Smaller Vessel .	Destroyer	½ "	20 "
		Torpedo Boat . . .	¼ "	4 "
1	Destroyer . . .	Torpedo Boat . . .	¼ "	5 "
2	Of any class in this column . . .	One of the class immediately above . . .	Same distance	Double the time.
1	Of any class . .	Cannot put out of action one of same class.		
2	One of a class and a smaller one . .	One of the same class as the larger	Same distance	Same time.

By smaller vessel is meant one not a Cruiser that has guns above a 12-pr., and at least two Q.F. 6 or 3-prs.

No ship can put two other ships out of action in the same time—each must have its separate time allowance.

No Battleship can be put out of action unless "met" by two or more Battleships, or struck by a Torpedo.

Single ships put out of action under these rules can take no further part in the Manœuvres, but must return to port of assembly and await orders from the Admiralty.

The period of "action" is to be between the two guns which the larger ship must fire to mark it—the first is to be fired when the two ships, in the judgment of the officer observing from the larger ship, are within the prescribed distance, and the second at the expiration of the time allowed.

No other guns than these mentioned above are to be fired in actions between single ships; but though gun fire will have no part in deciding the issue between Fleet actions, yet in order to make the exercise of going to Quarters more complete, Admirals in command of Fleets "meeting" are to use blank ammunition at their discretion.

Admirals having Torpedo Boats under their orders can establish Torpedo Boat Stations at any ports in their territory, and similarly Admirals having Torpedo-Boat Destroyers in their Fleets can establish Destroyer Stations in their own territory.

All islands, with the exception of Bere Island, are neutral, and cannot be used as bases of operation.

The situation now defines itself as follows:—Lord Walter Kerr in chief command of the Channel Fleet had detached a portion of his squadron to represent reinforcements preparing for him at a friendly port not yet known to his adversary and was "lying in readiness at a chosen anchorage," the anchorage chosen being Berehaven. The territory friendly to him was Ireland with the exception of Lough Swilly, which was friendly to his adversary. Admiral Seymour, in chief command of the Reserve Fleet, having distributed that fleet in a manner similarly unknown to Lord Walter Kerr, was with his own section of it "in port" at Milford Haven. The territory friendly to him was England within the limits assigned with the exception of Portland, which was friendly to his adversary. Admiral Seymour was provided with twenty-four torpedo-boats and Lord Walter Kerr with twenty destroyers, and each could place these auxiliaries where he pleased within the territory friendly to him. War was imminent but not declared, and the exact moment of its declaration would only be made known a short time beforehand. It will be more convenient to give the detailed distribution and disposition of the opposing fleets and their respective reinforcements at a later stage of the narrative, because full information on this point, though necessarily in the possession of the Admiral in chief command on either side, was not at this stage accessible to the other side. It was however a certain inference from the "General Orders and Instructions" that the "fleet lying in readiness at a chosen anchorage" was either actually or conventionally superior to the "fleet in port" which it was required to watch.

The situation further defined.

A nice question here arises. Were the cruisers of either side at liberty to put to sea before the Admirals in chief command had received information of the exact time at which war would be declared? We have seen that where actual war is in prospect, the cruisers of a naval power would probably be sent to sea betimes with full liberty to observe and report, subject only to the obligation to abstain from warlike or provocative acts. The "General Orders and Instructions," and the "Rules and Regulations" above quoted, are silent on the point, and their silence might be taken to imply that what they did not forbid they permitted, subject only to the established laws and usages of war, or of a state of anticipated belligerency. There is no law or usage of war which forbids an expectant belligerent to take such measures as are consistent with a state of peace, and are not disallowed by policy, to learn as much as he can of the plans and dispositions of his future adversary. If this view is correct, there would seem to be no reason why the cruisers of both sides should not have put to sea as soon as

The question of cruisers.

they were coaled, or, at least, as soon as the fleets to which they belonged were reported to the Admiralty to be ready for hostilities. This is certainly a legitimate inference from the silence of the instructions on the point, and from the conditions of the general situation established; because if the cruisers of the fleet "lying in readiness" at Berehaven were not allowed to leave in ample time to enable them to be off Milford Haven before the fleet in that port was free to quit, no "watch" could possibly be established, and the very first stage of the operations would be reduced to a nullity. It may be presumed, therefore, that the rules and instructions issued by the Admiralty were intended to be read subject to the understanding that the established laws and usages of war were to be considered applicable to the operations, except so far as they were explicitly suspended by any rule or instruction issued to that effect.

Cruisers not sent out in advance.

They were not so understood by either of the Admirals in chief command. If they had been, the curious consequence might have followed that each Admiral would have been able to ascertain beforehand the whereabouts and strength of the reinforcements preparing for his opponent—information which was deliberately withheld by the Admiralty until a later stage of the proceedings. It has, moreover, been the usual practice in the manœuvres of former years for the cruisers to remain in port until the Admiral in command has received specific permission from the Admiralty to send them to sea. It would seem that the influence of this established practice induced the Admirals in chief command to read a similar provision into the regulations for 1896, although it was really conspicuous by its absence; and although it was probably the intention of the Admiralty to leave the Admirals free to use their cruisers at their discretion, subject only to the necessity of keeping them so far in hand as to be able to inform them of the exact time when hostilities would begin, and to the obligation of abstaining from warlike acts before that time. It is to be regretted, perhaps, that the rules and instructions were not a little more explicit on this point. It is not desirable to turn naval officers into sea-lawyers. In actual warfare it is a high merit in a commander to be quick to seize every possible advantage. It is, perhaps, a still higher merit in manœuvres for an Admiral so to conduct his proceedings as to allow no important issue to degenerate into an unprofitable dispute before the umpires. In this case both Admirals appear to have read their instructions in the same sense, and hence no difficulty of the kind arose. But if one had read them in one sense, and the other in another, the whole course of the proceedings might have been vitiated from the outset by a dispute which must have been referred to the umpires,

and would probably not have been decided until after the close of the operations. It will be recollected that an unprofitable dispute of the kind arose during the manœuvres of 1893, when one of the Admirals engaged interpreted his instructions in a sense different from that in which they were understood by the other three. He was justified, perhaps, by the letter of his instructions, but there is reason to think that he was held by the umpires and by the Admiralty to have violated their spirit. The clerical economy, which leaves an interval of ambiguity and uncertainty between the spirit of a public document and its letter is very rarely to be commended. "Cela va sans dire," said a diplomatic colleague to Talleyrand in the course of a negotiation. "Oui, sans doute," replied Talleyrand, "cela va sans dire; mais cela va beaucoup mieux en le disant."

Grave importance of the question.

The question was really one of grave importance, because unless Lord Walter Kerr was able to place his cruisers in such a position that they could make certain of being off Milford Haven before the time when Admiral Seymour would be free to leave that port, it was manifest that the watch he was required to keep could not possibly be established. The distance from Berehaven to Milford is 200 miles. The effective sea-speed of the fastest cruisers at Lord Walter Kerr's disposal did not exceed 16 knots; therefore, the shortest time in which these cruisers could be expected to reach Milford Haven from Berehaven was 12½ hours, and for practical purposes it may be said that, if they were required to start from Berehaven they must leave that anchorage at least 13 hours before Admiral Seymour was free to quit Milford Haven in order to be certain of observing the exit of the latter. It is to be regretted that Lord Walter Kerr did not allow this consideration to determine his preliminary dispositions. His instructions do not seem to have forbidden him, either directly or by implication, to place his cruisers in any convenient port within the territory friendly to him, there to await his orders to put to sea. Queenstown was such a port, in direct telegraphic communication with Berehaven, and some 80 miles nearer than the latter to Milford. There was certainly nothing in the rules to forbid his selection of Queenstown instead of Berehaven as the point from which his cruisers should start, and there is nothing in the usages of war to prevent an expectant belligerent from moving any of his forces from one of his own ports to another. But probably his freedom of action in this respect was restrained by the traditions and the precedents of the manœuvres of former years. If so, the fact discloses a very important and rather disquieting feature in the educational aspect of manœuvres which has, so far, been entirely overlooked. It is most inexpedient, in every respect, that a set of

traditions and precedents should be allowed to grow up which are regarded as applicable to manœuvres, though they bear no relation to the procedure of actual war. Real warfare is not conducted according to fixed rules and prescriptions; still less is it governed by artificial traditions and precedents. The only rules which control its conduct are the general provisions of international law, and the usages which all civilized nations consent to observe. For the purpose of manœuvres, which are and can be only an approximation to the conditions of real warfare, these rules need to be supplemented by provisions specially adapted to the circumstances of the case. But the paramount rules and usages of war are in no wise abrogated thereby; they are rather emphasized by the fact that manœuvres are intended to be as close an imitation of war as possible, and are only modified to the extent of such special provisions as are dictated by the consideration that the imitation is not and cannot be the reality. So far as manœuvres tend to impair in the minds of naval officers that freedom and originality of initiative which is the very essence of successful warfare, or to fetter their independence of judgment in the bonds of artificial precedent and tradition, their educational influence must be pronounced to be simply mischievous. If the manœuvres of 1896 be thought to have miscarried to some extent, the miscarriage must be regarded as due in the main to influences of this character. In that case they have disclosed a growing tendency to formalism, which it is of the utmost importance to check and correct at once. It is none the less to be regretted that the great principle, which has, perhaps, been too much lost sight of in recent years, that manœuvres mean as much of war as is compatible with a condition of friendly and innocuous conflict, should have been left to be inferred from the regulations, and not explicitly enunciated with more than ordinary emphasis.

Proceedings of Lord Walter Kerr.

Rightly or wrongly, however, Lord Walter Kerr kept his cruisers at Berehaven until about noon on Friday, July 24, when he was informed by the Admiralty that war would be declared at the next ensuing midnight. The cruisers were forthwith sent to sea with instructions to take up with all despatch a position of observation off Milford. It was too late, as everyone knew, if Admiral Seymour was free to leave his port and thought it good policy to do so, the moment war was declared. But it was still possible that some of the destroyers which had been stationed at friendly ports within the Irish Channel and along the south coast of Ireland might happen to be off Milford at midnight and in a position to observe the movements of Admiral Seymour. On the other hand, as their proper function was the destruction of the enemy's torpedo-boats, the exact stations

of which had not yet been ascertained, no certain reliance could be placed upon this source of information. Lord Walter Kerr himself remained with his main squadron at Berehaven. That it was right and necessary for him to do so until war was actually declared seems to be indisputable. But the phrase contained in the "General Orders and Instructions" first issued, namely, "the watching of one fleet in port by the cruisers of another fleet lying in readiness at a chosen anchorage," was not perhaps entirely free from ambiguity. The construction which found favour with Lord Walter Kerr—probably after consultation with the commanding officers of his squadron—was that he was not free to leave the chosen anchorage in which he was supposed to be "lying in readiness" so long as the enemy remained "in port," that is, until he received specific intelligence that the enemy had put to sea, intelligence which he could only receive through his signal-stations after some considerable delay. The regulations, however, certainly did not explicitly forbid his quitting Berehaven the moment war was declared, and probably he would have been better advised to do so. The phrase "lying in readiness" taken by itself might almost seem to suggest his doing so just as the significantly different phrase "in port" applied to the enemy's fleet might, by parity of reasoning, be almost taken to imply that the latter was not yet "in readiness." As a matter of fact Lord Walter Kerr, although he was "lying in readiness," did not think himself entitled to put to sea until he heard that the enemy had done so; whereas Admiral Seymour, although only officially described as "in port," and therefore presumably not quite "in readiness," did think himself at liberty to put to sea the moment war was declared. It is impossible to say that either Admiral was wrong; but it is certain that the manœuvres would have had a very different and probably a more instructive issue if each had adopted in his own case the interpretation which commended itself to his adversary.

Proceedings of Admiral Seymour.

Precisely at midnight between July 24 and July 25, Admiral Seymour weighed anchor with the whole of his fleet, then lying in Milford Haven, and quitted that port, steering to the southward. Lord Walter Kerr's cruisers, having quitted Berehaven less than twelve hours before, were not at hand to observe this movement; but Admiral Seymour's exit was accidentally observed by the destroyer Boxer, which, instead of immediately reporting to the nearest signal-station, appears to have continued its night's work of looking out for the enemy's torpedo-boats, and only reported the escape of Admiral Seymour on its return to its station at Kingstown in the course of the next morning. This information did not reach Lord Walter Kerr until about 3 P.M. on the 25th; but immediately

on its receipt the fleet under the command of the latter put to sea, and, having got clear of Bantry Bay, steered a course for a point 25 miles south of Scilly, so as to command the entrance of the English Channel, a destination chosen as offering the best chance of encountering the enemy's fleet. As the fleet was leaving Bantry Bay it was rejoined by the Sirius, one of the cruisers sent to watch the enemy in Milford Haven. The Sirius saw nothing of the enemy, but came across the destroyer Hunter, which had also observed the escape of Admiral Seymour. Ordering the Hunter to proceed to the nearest signal-station and report at once to Lord Walter Kerr, the Sirius returned at full speed to Berehaven. The Hunter's message had not been delivered when the fleet left its anchorage, and it may be remarked, in passing, that the performances of the signal-stations throughout the manœuvres reflected little credit on the promptitude, intelligence, and general efficiency of those in charge of them.

Further instructions issued to both sides.

Twenty-four hours after war was declared, that is, at midnight between Saturday, July 25, and Sunday, July 26, the Admirals were empowered to break the seals of the further instructions issued to them. These were found to contain, among other documents, the following:—

GENERAL IDEA.

Four Fleets will be engaged in the Manœuvres—Fleets A and B on the one side, and Fleets C and D on the other.

The operations will take place in the following area—between latitudes 49° and 56° N. and longitudes 2° and 15° W.

On the commencement of the Exercise, equivalent to a declaration of war or commencement of hostilities—

Fleet C will be at Milford Haven, watched by the cruisers and destroyers of Fleet A, which will be lying in readiness at Berehaven.

Fleet B, which is to co-operate with A, will be in Dublin Bay, "being organised." This will be known to C; but the strength of it, and that it cannot put to sea for forty-eight hours, will only be known to A.

Fleet D, which is to co-operate with C, will be at Torbay, "being organised," unknown for twenty-four hours to A or B, and its strength and inability to put to sea for forty-eight hours only known to C.

All the coast of Ireland (with the exception of Lough Swilly) and Portland is friendly to A and B and hostile to C and D.

With the exception of Portland, all the coast of England within the defined area and Lough Swilly is friendly to C and D and hostile to A and B.

A's objective is, first, to get C out and defeat him; secondly, when he learns of the existence of D Fleet, to prevent the junction of C and D until he has been joined by B; thirdly, to prevent C and D finding safety in Lough Swilly.

C's objective is, first, to unite with D and defeat A if he meets him unsupported; secondly, failing in this object, to get to Lough Swilly either singly or combined with D before the sixth day.

The Battleships of each Fleet being present—

A Fleet is superior and of greater speed than
C Fleet. C is superior to
B, and B is equal to, but of greater speed than
D Fleet.

If A Fleet "meets" C Fleet, the latter must return to Milford Haven.

If A Fleet "meets" D Fleet, the latter must return to Torbay.

If A Fleet "meets" C and D Fleets combined, A must return to Bantry.

If A "meets" C, after having been in action and defeated D, the first must return to Bantry; but if a junction with B has been effected before meeting C, C must go back to Milford.

If Fleet B "meets" Fleet D, no decisive result can follow, unless through the

absence of any Battleships one Fleet is at the moment superior to the other, in which case the inferior Fleet must go back to its base.

Fleets "meeting" is to mean the Battleship Squadron being within 3 miles of each other for two hours.

Return to the base port involves anchoring, but immediately after a Fleet may resume operations.

The ports assigned for the assembly of the Fleets being Naval bases, with Coast Defence Ships or Reserve Torpedo Boats available, only Fleets A and B combined can prevent Fleet C going in to either Milford Haven or Lough Swilly, if they meet within 20 miles of the entrance; but A can defeat D if they "meet" under those conditions.

The duration of "active operations" will extend over five consecutive periods of twenty-four hours, within which time the Admirals commanding Fleets A and C, with the co-operation respectively of Fleets B and D, and with all other means at their command, will make every effort within the rules to attain their object in whole or in part.

Within the larger operations of the Fleet the following secondary operations will take place:—

Torpedo Boat Stations can be established by C at any ports in his territory.

Destroyer Stations can be established by A at any ports in his territory.

C's Torpedo Boat objective will be to destroy all Battleships of the opposing Fleet in a certain area, and to protect his own Fleet in the narrow waters.

A's Torpedo objective will be to destroy all Torpedo Boats wherever they can be found.

All ports used as bases for the Fleets, as well as Portland and Lough Swilly, are Torpedo Boat proof.

This was accompanied by the following table:—

Composition of the Four Fleets, and their Bases of Operation.

Base.	Battleships.	Cruisers.	Smaller Vessels.	Destroyers and Torpedo-Boats.	
		Fleet A.			
	Majestic (flag)	Naiad	Speedy	Decoy	Dragon
	Royal Sovereign	Sirius	Harrier	Handy	Janus
	Empress of India	Apollo	Hussar	Lightning	Boxer
Berehaven	Repulse	Thetis	Spanker	Salmon	Bruizer
	Resolution	Tribune		Sunfish	Daring
		Forth			
		Severn			
		Fleet B.			
	Magnificent (flag)	Bellona	Halcyon	Hart	Lynx
	Blenheim*	Latona	Alarm	Hunter	Banshee
Dublin Bay	Hermione*	Andromache	Antelope	Snapper	Havock
	Charybdis*	Melpomene	Hazard	Ferret	Hasty
				Contest	Porcupine
		Fleet C.			
	Alexandra (flag)	Australia	Leda	Landrail	Spider
	Benbow	Galatea	Niger	95 87	84 79
	Edinburgh	Mersey	Onyx	76 74	68 66
Milford Haven .	Colossus	Iris	Renard	65 58	52 50
	Sultan	Phaeton	Circe		
		Iphigenia			
		Terpsichore			
		Fleet D.			
	Sans Pareil (flag)	Melampus	Jason	Curlew	Seagull
	Dreadnought	Indefatigable	Sharpshooter	85 81	77 73
Torbay . .	Thunderer	Brilliant	Sheldrake	71 67	64 59
	Devastation	Pearl	Jaseur	57 55	49 27

Fleet A is superior to Fleet C. Fleets B and D are equal to each other in all except speed. Cruisers marked with an asterisk count as battleships.

Complete development of the situation.

The situation was now fully disclosed. The first objective assigned to A was "to get C out and defeat him." The former part of this objective had already been accomplished by C's own initiative without the intervention and almost without the observation of A; and the initiative thus taken by C now served equally to frustrate the latter part. C knew that his reinforcements were "being organised" at Torbay, which was considered for the purpose of the operations to be a fully defended port, secure and torpedo-boat proof, and therefore inaccessible to any form of naval attack. This only became officially known to A when the Admiral of A opened his further instructions twenty-four hours after war was declared and when his fleet was already at sea; but Lord Walter Kerr had probably satisfied himself from unofficial sources of information that, if not at Torbay, the D Fleet under the command of Rear-Admiral Wilson was not very far off, and that wherever it was it was unassailable. Now, if Admiral Seymour assumed, as he had every right to assume, that Lord Walter Kerr was not free to leave Berehaven until war was actually declared, he must have seen clearly enough that if he left Milford Haven at the same time he could reach Torbay without running any appreciable risk of being intercepted. Berehaven is 300 miles from Torbay, Milford Haven only 214 miles. If Admiral Seymour could command a speed of only 10·7 knots, he could from Milford Haven reach Torbay in exactly the same time that Lord Walter Kerr, leaving Berehaven simultaneously and maintaining a speed throughout of 15 knots, could reach it in. But for twenty-four hours after the time when he might have left Berehaven, Lord Walter Kerr did not know for certain that the D Fleet was at Torbay. In these circumstances he had no reason at the outset to steam direct at his topmost speed for Torbay, and even if a happy but rather precarious inspiration had induced him to do so, he could only have reached it in time to see Admiral Seymour anchoring at his ease under the protection of its putative defences.

The problem apparently insoluble.

Thus it would seem that quite apart from any ambiguities in the rules the first objective assigned to the A Fleet was practically impossible of attainment, and on the other hand that the objective assigned to C could hardly be missed by any admiral who had his wits about him. C was required to unite with D. There was nothing to prevent his doing so unless indeed the rules forbade him either to quit Milford Haven before the expiration of a certain time after the declaration of war, or to seek the shelter of Torbay before a still further period had elapsed. On the face of it the rules disclose no such prohibition, and it cannot be argued, in this place at any rate, that Admiral Seymour could be expected to find certain pro-

hibitions in the rules which they did not bear on their face, after it has already been argued that Lord Walter Kerr would have been better advised to do just the contrary. No official comment on the proceedings, such as has generally been prepared and issued by the Admiralty in former years, had been presented to Parliament when these pages were passed through the press. In default of such elucidations as such a comment may be expected to offer, the problem involved in this phase of the operations must be dismissed as insoluble.

C and D unite without interference from A.

The C Fleet reached Torbay on the evening of July 25, and there remained in perfect security until the reinforcements "being organised," consisting of the D Fleet, were free to quit that port at midnight between July 26 and July 27. The A Fleet did not reach the mouth of the Channel until the morning of the 26th, and there it found nothing and obtained no tidings of the enemy. Entering the Channel and proceeding towards the Lizard, it observed some hostile cruisers; but their position and movements afforded no information of importance. The Sirius was sent ahead in the afternoon to reconnoitre Torbay, but the main body of the fleet retired towards evening to the Land's End, and shaped a course at nightfall towards Waterford, where a rendezvous had been arranged with the cruisers previously detached to observe Milford and with the reinforcements "being organised" at Kingstown, consisting of the B Fleet under the command of Rear-Admiral Powlett, which would be free to quit its port at midnight between the 26th and 27th, and was expected to reach the rendezvous about 8 A.M. on the morning of the 27th. Lord Walter Kerr had received information before he left Berehaven that Admiral Seymour had escaped from Milford, and having been officially informed before he reached the Channel that D Fleet was at Torbay, he could not fail to draw the inference that the first objective assigned to him was no longer attainable. He had got C out, it is true, or rather C had got himself out long before A appeared on the scene, and as he had not seen him at all and did not yet know where he was, he could not hope to defeat him. The second objective assigned to him was "when he learns the existence of D Fleet to prevent the junction of C and D until he has been joined by B." This was now equally unattainable, though he did not know it for certain until the morning of the 27th, when the Sirius rejoined and reported that all the battleships of C and D Fleets were at anchor in Torbay on the previous evening. As a matter of fact, the junction of C and D had been effected some hours before A had even learned the existence of D from official sources and more than twelve hours before B would be free to quit its anchorage for the purpose of joining A.

Initiative passes to C.

Thus the first two tricks of the game were won easily and rapidly by C. Looking at the cards held by the two players, it is hard to see how they could have been lost. The cards played themselves, and, so far as can be seen, nothing but a revoke on the part of C could have given A a chance. It now became C's turn to lead, and here, though the odds were not unequally balanced, there was perhaps an opening for A to retrieve the game. The objective now assigned to C (an expression which is henceforth to be read as signifying C and D combined) was "to defeat A if he meets him unsupported." For this purpose C had no very strong cards in his hand. The maximum speed of his fleet was in the most favourable circumstances barely 12 knots. A could steam 14 with ease and for any length of time so long as his coal lasted. In these circumstances the only danger of defeat that A unsupported could incur was by allowing C and D united to get between him and B, in waters so narrow that he could not extricate himself by means of his superior speed. As soon as he had learned the existence and position of D, he was safe anywhere to the westward of that position, and the nearer he could get to Torbay without exposing himself too unguardedly to the attack of C's torpedo boats the more advantageous would be his position of observation. Perhaps until he knew for certain that C was to the eastward and not to the westward, the nearest position he could occupy with safety towards nightfall was off the Land's End, and probably he was well advised to withdraw during the night from that position in order to baffle the enemy's torpedo-boats, which actually did attack him at daybreak, though they were easily beaten off.

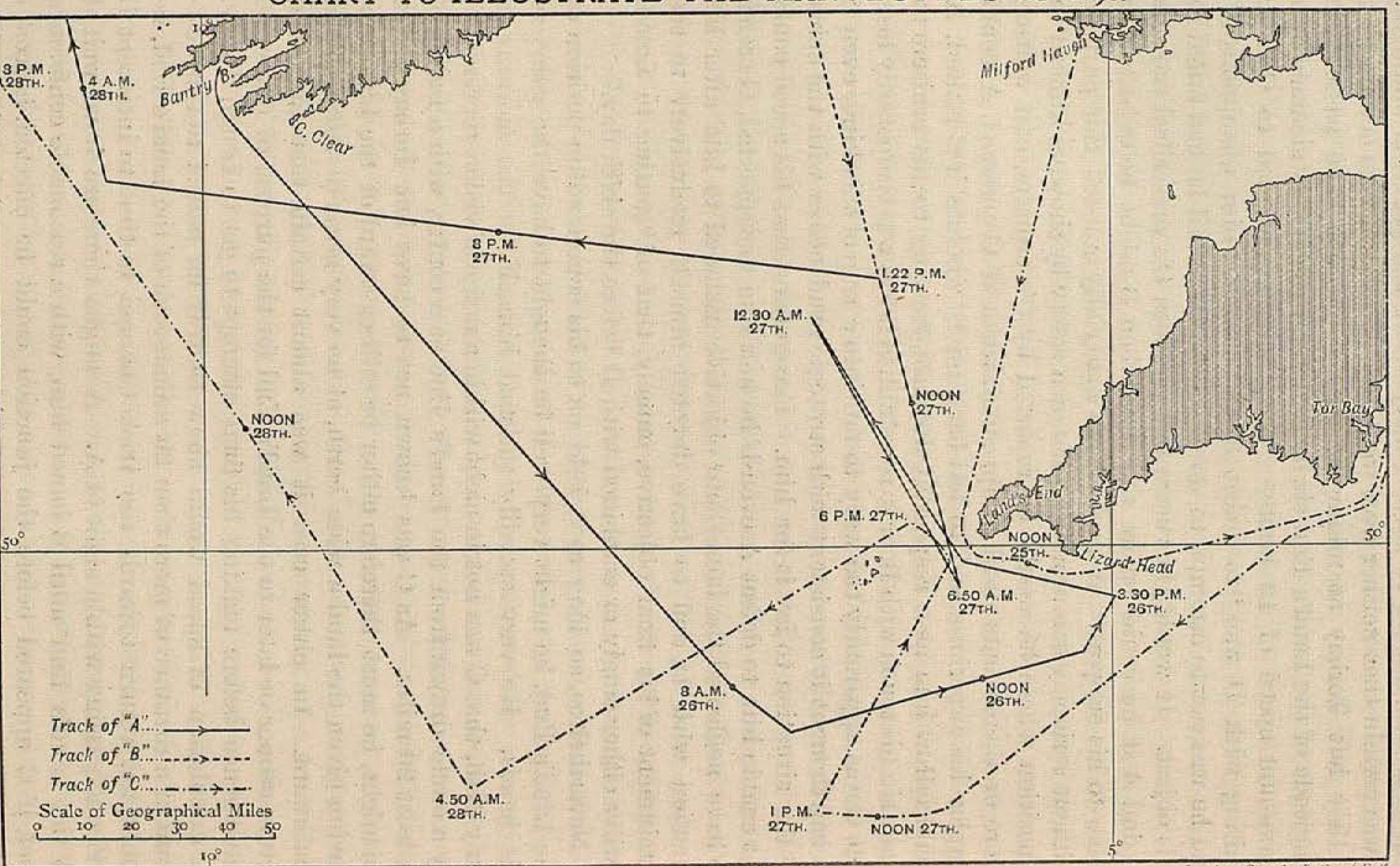
Difficulties of A.

But A's proceedings were undoubtedly hampered by the rendezvous given to B off Waterford. It would seem that when A left the Land's End at nightfall on the 26th his original intention was to return to this rendezvous. But his plans were changed during the night for reasons apparently based on the hypothesis that C might have been forbidden to enter Torbay, and was, in that case, probably cruising about and seeking to elude observation somewhere to the westward or somewhere in the Bristol Channel. Perhaps a further reason may have been that the exact whereabouts of C not having yet been ascertained, it was unwise of A to quit the most advantageous position of observation until his intelligence was more complete. But whatever his reasons may have been, A altered his course during the night, detaching a cruiser to inform Admiral Powlett of his change of plan, and reappeared at the Land's End at an early hour on the morning of July 27, where the Sirius rejoined, as already mentioned, and reported that C and D Fleets were anchored in Torbay. It was now known to A that C and D had united, and

that as D was unable to leave Torbay before the previous midnight, it was certain that neither fleet would do so. It was also certain that if they left Torbay at midnight, they could not have passed the longitude of the Land's End six hours later, even if they steamed at a maximum speed of 12 knots. The objective assigned to C after uniting with D was "to defeat A if he meets him unsupported," and he was not to attempt to do anything else until he had failed in this object. It would thus seem to have been C's prescribed purpose to find A if he could before the time when B might be expected to come to his support. A could have materially assisted this purpose without seriously compromising his own safety by showing himself in a position where he would be reported by C's cruisers, and waiting there or thereabouts until C appeared, when if C pursued, A could employ his superior speed to fall back on B, whereas if C retired, A could follow him at a respectful distance, trusting to his cruisers to maintain his touch with B, or to re-establish it if it was temporarily lost. But C was apparently too wary to fall into a trap of this kind, even if A had thought it consistent with strategic prudence or with the spirit of the situation to lay it for him. Recognising that his speed could not enable him to defeat A even if he met him unsupported, C seems to have neglected the immediate objective assigned to him after his junction with D, and to have devoted himself exclusively to the attainment of his final objective, namely, that of "getting to Lough Swilly either singly or combined with D before the sixth day."

His commanding position at the Land's End.

Nevertheless, so long as A held on to his commanding position at the Land's End, he might very well be thought to have the game in his hands. He very speedily satisfied himself on the morning of July 27th, that C was not in sight within a range of vision represented by a circle drawn from the Land's End as a centre, with a radius of at least 20 miles. As C was known not to have left Torbay before midnight, he must therefore either be still eastward of the Lizard or, having given the land a wide berth, at no very great distance to the southward. In either case it was almost certain that he would return sooner or later to the Land's End for the purpose of obtaining intelligence before making his final attempt to get to Lough Swilly. A calculation of speed would show that, if he passed to the westward at a distance of more than 20 miles south of the Land's End, he could not return towards the Irish Channel in time to intercept B without passing within sight of A. A might therefore have waited at the Land's End until B joined him, with a reasonable confidence that, if C appeared before the junction could be effected, he could fall back on B's line of advance without compromising the safety of either division of his fleet.


CHART TO ILLUSTRATE THE MANOEUVRES OF 1896.
3 P.M. 28TH.
4 A.M. 28TH.
Bantry B.
C. Clear
Milford Haven
8 P.M. 27TH.
1.22 P.M. 27TH.
12.30 A.M. 27TH.
NOON 27TH.
NOON 28TH.
Tor Bay
Land's End
6 P.M. 27TH.
NOON 25TH.
Lizard Head
6.50 A.M. 27TH.
3.30 P.M. 26TH.
8 A.M. 26TH.
NOON 26TH.
4.50 A.M. 28TH.
1 P.M. 27TH.
NOON 27TH.
50°
5°
10°
Track of "A"
Track of "B"
Track of "C"
Scale of Geographical Miles
0 10 20 30 40 50
London: Stanford's Geog! Est!

The situation has so far been considered without taking account of the scouting capacity of A's cruisers. It is true that A was not at this time very well provided with cruisers, and that such as he had were busily engaged during the morning of the 27th in clearing away the cruisers of C, one of which they captured. But this was because he thought it expedient to leave the Land's End, and therefore desired that his junction with B and his subsequent movements should not be observed by the enemy. Had he decided to remain at the Land's End until B arrived there, it would serve his purpose, or at least not interfere with it, to be observed, and thereby to induce C to attempt to "meet him unsupported." In that case his cruisers would have been available for scouting purposes; and as it was certain that C, if not to the eastward of the Lizard, would be found at no very great distance to the westward and southward, it is probable that even the few cruisers he had at his disposal would have been found equal to the not very difficult task of discovering him. It is at any rate to be regretted that the attempt was not made, because even its failure would have been instructive, and as matters turned out would not materially have affected the issue. C having given the Lizard a wide berth and made a considerable stretch towards the westward, returned in the afternoon of the 27th towards the Land's End, which he reached about 6 P.M. But A had by this time quitted his commanding position, and a great opportunity was lost.

A's cruisers not employed in scouting.

It is easy to be wise after the event. It was impossible for A to know, however strongly he might conjecture, that C would return towards the Land's End before making for Lough Swilly, and, not knowing it, there was possibly no good reason why he should base his dispositions on a contingency. On the other hand, it was equally impossible not to know that, unless C was to the eastward of the Lizard in the early morning of the 27th, he must be to the westward of it at no great distance from A's own position, although not within sight. In any case A's own position was safe at the Land's End until C made his appearance there, and, being safe, it was also advantageous. If he could do nothing there to bring about a "meeting" with C after combining with B, still less would he be likely to do anything anywhere else, except towards the close of the operations at Lough Swilly or in its neighbourhood. This, indeed, appears to have been the view on which he ultimately resolved to act. For, having quitted the Land's End on the morning of the 27th without having obtained any intelligence concerning the whereabouts and movements of C, and having effected his junction with B at a point between Waterford and the Land's End and rather nearer to the latter, he shaped a course with the combined fleet for

Criticism of A's proceedings.

Cape Clear, detaching a strong contingent of cruisers to occupy the northern exit from the Irish Channel, and give him timely notice off Lough Swilly of the approach of C, in case the latter was found to be advancing by that route.

Criticism continued.

It cannot be denied that this was practically to give up the game. There was a chance, of course, and it was not overlooked in Lord Walter Kerr's calculations, that C having himself decided to make for Lough Swilly by the western route might be found in the neighbourhood of Cape Clear, and dispositions were made for his discovery in that event. But the chance at its best was a much more remote one than that which had previously offered itself at the Land's End, because at the latter point the position of C could be determined within comparatively narrow limits of space and time; whereas no such limiting conditions applied to the position off Cape Clear. It was reasonable to suppose that C would use his best endeavours not to allow A and B united to get behind him, since their superior speed would in that case almost certainly lead to his defeat before he could "find safety in Lough Swilly." It follows that he had no motive for reaching Lough Swilly earlier than just in time to make his entry before the close of the operations. In the meanwhile, his safest and perhaps his only safe course was, after ascertaining that A and B were not behind him—as he probably did when he returned towards the Land's End on the afternoon of the 27th—to keep as far away from the land as possible, so as to elude discovery by A's cruisers and, therefore, to remain as long as possible in the south-western area of the field of operations. Such a course manifestly offered a better prospect of success than if he attempted to pass through the Irish Channel, which was certain to be occupied either by an adequate observing force of A's cruisers, or by A himself with an adequate fighting force. Lord Walter Kerr was therefore doubtless well inspired in believing that C would attempt to reach Lough Swilly by the western and not by the eastern route. But he was not perhaps quite so happily inspired in thinking that the chance of meeting him in the neighbourhood of Cape Clear was worth considering. Such a contingency was too remote.

Disadvantages of A's choice of the western route.

Probably it did no more than determine the balance of A's choice between the eastern and the western routes to Lough Swilly; but the choice made in favour of the western route was not without appreciable risks. Had it so happened that C had been close upon the heels of A, though not within range of observation when A finally left the Land's End, and had C obtained information of the course taken by A and B after effecting their junction, he might, by pressing forward with all speed through the Irish Channel, have

reached Lough Swilly before A arrived there. But Lord Walter Kerr had evidently convinced himself that C would take the western route, and no doubt all the indications—which, however, were mainly negative—pointed to that conclusion. He could therefore feel tolerably certain that if he could reach Cape Clear in advance of C or not very much behind him, he could reach Lough Swilly before him and might find an opportunity of bringing him to action on his way. To this latter contingency, however, he would seem to have attached very little importance. He appears to have persuaded himself that no decisive result could follow from a meeting of A and B combined with C and D combined, and this persuasion was certainly shared by more than one of his captains. There were certain phrases in the rules which, taken by themselves, might seem to support such a view; but as it was specifically stated that A was superior to C, and B equal to D, the inference that A *plus* B must be superior to C *plus* D would seem to be irrefragable unless it was explicitly disallowed by a specific statement in the immediate context to the contrary effect. Besides, if A *plus* B was equal and not superior to C *plus* D, the equation must hold in all circumstances and positions, and would therefore apply to the position off Lough Swilly as much as to any other position. If, on the other hand, Lord Walter Kerr held, as his dispositions would seem to imply, that the equation did not apply to Lough Swilly, though it did apply everywhere else, it is not very easy to see why he should have taken a course which involved at least a chance of meeting C in some position where the equation did apply and no certainty of intercepting him in the only position where it did not apply.

A's run to Lough Swilly.

The movements which finally brought both fleets to Lough Swilly need not be considered in much detail. A reached Lough Swilly at midnight, between July 28 and July 29, after a memorable and perhaps unprecedented run of 455 miles in 34 hours, giving an average speed of 13·7 knots for the whole distance, which was accomplished without pressure and with a margin of at least a knot still in reserve for emergencies by ships seven months out of dock. "No doubt," wrote the correspondent of the *Times* on board the Majestic, "an extra half knot or even more might have been obtained at some risk of temporary breakdown and by special arrangements in the stokeholds; but no admiral cares to press his fleet to the extreme limit of its capacity, leaving no margin whatever for the emergencies of weather, evolution, or casualty, over a run of 450 miles. He will always keep at least a knot in hand. The wisdom of this is shown by the fact that towards the close of the run a general signal was made inquiring how long the ships could

maintain their then rate of speed—namely, 84 revolutions, equivalent to a speed, as tested by observations and the chart, of 14 knots over the ground. The answer from every ship was, that the speed could be maintained as long as the coal would hold out. I am aware that this is rather an abatement of the nominal and paper speed of the ships, but I am not aware that any longer run has ever been made at higher speed with such satisfactory results by a fleet of ships all of them seven months out of dock, and I very much doubt whether any other fleet in the world could have accomplished it in like conditions and with like results."

A's dispositions off Lough Swilly.

A speedily ascertained that C had not reached Lough Swilly in advance of him, and forthwith made his dispositions for watching the entrance to that port. It was necessary to intercept C at such a distance from Lough Swilly that the two fleets could remain within three miles of each other for two hours before C was in a position to claim the shelter and protection of the port. In other words, C must be encountered at a distance of 20 to 25 miles from the entrance. A had thus to watch an area of considerably more than a semicircle, having its centre at the entrance to Lough Swilly and a radius of some 25 miles, and to be prepared to encounter his adversary at any point of the circumference: It is evident that the problem was by no means easy of solution and that, whatever the dispositions of A might be, the odds were still largely in favour of C, unless A was exceptionally favoured by the weather and to some extent by the chapter of accidents as well. Neither helped him in the least. The weather was all against him, and the chapter of accidents did nothing for him. The cruisers were placed at convenient points on and beyond the circle of necessary observation, and the battleships, disposed in single line ahead at three cables distance, cruised backwards and forwards along a chord of the same circle between Tory Island to the westward, and the island of Inishtrahull to the eastward. This order was maintained throughout the whole of July 29th, and the ensuing night; and the day had broken on the morning of the 30th, before any trace of the enemy was observed. The weather was thick with frequent squalls of rain during the day, somewhat clearer during the early part of the night, but thickening again towards dawn. At no period was a clear horizon visible to seaward, and the range of vision was never more than five miles and often less than two.

Close of the operations and final success of C.

The operations were to end at 8 A.M. on the morning of July 30th. At dawn on that day the leading ship of the battleship column was off Tory Island for the last time. It was practically certain by this time that even if C could be discovered, which was very unlikely in

the weather then prevailing, he could not be encountered in a position which would enable A to bar his access to Lough Swilly. Course was accordingly altered, not as before in the direction of Inishtrahull, but so as to bring the column by a safe course to within a moderate distance of the entrance to Lough Swilly. This was apparently done, not so much for the purpose of attempting to intercept C, as for the purpose of ascertaining definitely whether he had attained his object before the time appointed for the close of the operations. The pen of the correspondent above quoted may here again be borrowed to describe the very dramatic close of a series of operations not otherwise very exciting:—

"Shortly before six, the mist thinned out a little, and Fanad Point, at the western entrance of Lough Swilly, had for some little time been visible at a distance of three or four miles, when the enemy's fleet was observed ahead approaching Lough Swilly from the eastward and already too near the entrance to be intercepted. . . . . Our whole proceedings during the night and early morning were very properly, in my opinion, governed far more by the paramount necessity of securing the safety of the fleet in weather and waters which strained the anxieties of those responsible for its navigation to the utmost, than by a too eager desire to frustrate the purposes of the enemy. . . . The operation in which we were engaged brought two great fleets numbering eighteen battleships and an indefinite number of cruisers into close proximity, when from the nature of the case they must be steering on courses and disposed in formations entirely unknown to each other. In clear weather no serious risk would be involved in the execution of such an operation, and in clear weather I do not doubt that Admiral Seymour must have been intercepted betimes. But the weather was very far from clear. If it had been much thicker than it was, I feel certain that Admiral Seymour would no more have attempted to enter Lough Swilly until it cleared than Lord Walter Kerr would have attempted to bar his passage. Each would have been far too much preoccupied with the overwhelming obligation of avoiding a perilous approach to the land on the one hand, and a not less perilous approach to the opposing fleet on the other, to give any thought whatever to the paltry advantage of securing success in an operation fraught with such hideous possibilities of disaster. . . . The result has shown that it is not possible in all circumstances of weather, atmosphere, and sea to prevent the entry of a fleet into a friendly port even when that port is watched by a superior hostile fleet in the offing. . . . I may be permitted to doubt whether, when obtained, such a result is worth very much after all. The proper business of a superior fleet is to seek

and defeat its adversary at sea, not to tie itself up to a hostile port, in the hope, necessarily vain in certain circumstances, of effectually stopping his earth. An admiral seeking the refuge of a friendly port cannot command his weather and cannot hope to secure his object if the weather is not peculiarly favourable to his enterprise. In such circumstances he is much more likely to avoid a position where he knows his adversary is present in superior force than to seek a precarious and fugitive safety at the risk of overwhelming disaster. Of course, in actual war, risks of navigation would be run which no admiral with a proper sense of responsibility would dream of running in time of peace. But the dominant reflection suggested to me by the experience of this morning and its result would bear witness, not to the value of the strategic conclusion involved, but to the genuine admiration which the country must feel for the skill and seamanship displayed on both sides."

Anterior proceedings of C.

A very few words are needed to describe the proceedings of C. As was conjectured by A, from indications obtained at the Land's End, and from information both positive and negative, albeit somewhat contradictory, obtained from the signal-stations on the east and west coasts of Ireland, C had approached Lough Swilly by the western route, timing his advance so as to reach his destination only a short time before the close of the operations, and shaping a course which would keep him as long as possible outside the range of effective observation by A's cruisers. At 10 P.M. on July 29th he had reached a point about 60 miles from Lough Swilly, in a north-easterly direction, and from that point he steered direct for the entrance. It would seem that in clear weather he must have been observed and intercepted; in the weather which prevailed his detection was practically impossible except by the merest accident.

General criticism of the situation.

The final remarks quoted above from the correspondent of the *Times* would seem to imply that the interception of C off Lough Swilly itself was an essential feature of the operations indicated in the "General Idea." But it is evident that it was only made so by the action of A himself. A's final objective was "to prevent C and D finding safety in Lough Swilly;" this was to be pursued as soon as he had failed to attain his second objective of "preventing the junction of C and D until he has been joined by B." The field of operations was wide, and the distance between Torbay and Lough Swilly is not less than 600 miles. Between the two there was abundant room for strategic developments of almost unlimited variety. The disposition chosen by Lord Walter Kerr was only one of many which might have been chosen. The choice of any other might have resulted in failure, but even so it would not necessarily

have been shown to be less judiciously chosen than the one which was actually selected and did actually fail. But the latter was, perhaps, the only one which made the interception of C in the immediate neighbourhood of Lough Swilly an essential feature of the operations. Almost any other must have had for its primary object, the interception of C at a point much nearer to his starting point than to his destination. If it succeeded, Lough Swilly ceased at once to be a factor of any moment in the strategic situation; whereas if it failed, it would probably have failed so completely as to deprive A of the power to "prevent C and D finding safety in Lough Swilly." But this latter consideration must make the judicious critic hesitate to pronounce Lord Walter Kerr to have been ill-advised in rejecting alternative dispositions which could at the best only offer a very evenly balanced chance of brilliant success on the one hand, and of somewhat mortifying failure on the other. In manœuvres every admiral wants to win, and the dispositions which best make for winning are often determined less by abstract considerations of strategy than by the artificial conventions which are needed to give a certain semblance of war to operations of a character essentially peaceful. The conventions framed for this purpose were, in the judgment of the present writer, masterly in conception, but they were not found to be free from obscurity and ambiguity by those who had to interpret them in practice. It is quite possible that but for this circumstance Lord Walter Kerr's arrangements might from beginning to end have taken an entirely different form. But on this topic there is little that is profitable to be said. In default of the usual official narrative of the operations, and of the instructive comment by which it has often been accompanied, the unofficial commentator cannot but feel that the least said the soonest mended.

The true strategic moral of the operations.

It is not perhaps amiss to point out, in conclusion, that the general instruction derived from manœuvres is happily independent of the success or failure of one side or the other. It is indeed rather a disadvantage than otherwise that all schemes of manœuvres which involve a strategic issue, must inevitably take a form which invests the question of success and failure with an importance to which it is not really entitled. When two sides are engaged both cannot win; but in manœuvres the conditions must be so arranged as to give each side as good a chance of winning as the other. In actual war we should never thus balance our fate on a knife-edge. We should take care, if we could, to give the other side no chance of winning. It is no paradox to say that Admiral Seymour was placed in very much this position from the outset, if, neglecting the personal equation altogether, and dismissing the question of success or failure as

immaterial, we consider the situation from an abstract and purely strategic point of view. In this regard the following remarks, taken from a leading article which appeared in the *Times* of August 10th, 1896, seem to be well worth considering:—" In spite of the success which attended Admiral Seymour's final enterprise, we cannot but think that the whole course and character of his dispositions illustrated most impressively the immense advantage enjoyed by the superior naval force, even when it fails to bring its adversary to immediate and decisive action. Admiral Seymour got away at the outset unwatched by his enemy's cruisers, but not entirely unobserved. Having escaped, he could undertake no more aggressive or exciting strategical object than to run away as fast as he could, in order to obtain the shelter of the secure fortified port in which his reinforcements were being organised. Having obtained his reinforcements, he could not even then succeed in bringing his unsupported adversary to an action, but was fain to hide himself away, and to thank his stars that his adversary's cruisers did not find him. In the pursuit of his ulterior object he was still compelled to follow the policy of evasion, taking the more circuitous and less frequented route, and finally slipping past his adversary into his appointed refuge in weather not less favourable to his purpose than paralyzing to the dispositions of his adversary. Such is, in our judgment, the true strategic moral of the whole proceeding. Skilful and successful as Admiral Seymour's dispositions were, they were governed from first to last by the overwhelming menace of the superior naval force and divested by that potent agency of every trace of aggressive purpose. No doubt the primary function of the superior naval force is, and must always be, to find its adversary at sea and fight him. But, failing that, it can desire nothing better than to see its adversary slinking into a place of refuge from which his exit without further reinforcements can only be followed in the end by the defeat which he has temporarily avoided by evasion. Evasion has never yet secured the command of the sea and never will. Command of the sea belongs to the superior naval force, and can only be wrested from it by victorious fighting."

Application of this moral to the case of England.

On this it may be observed that the precise strategic purpose involved in giving Admiral Seymour a place of shelter in the territory of his adversary was not disclosed in the "General Idea." If however it represented, as may be conjectured, either a rendezvous with an allied fleet coming from a distance or a friendly port in which reinforcements would be found, such an elucidation would only emphasize the view taken of the strategic situation by the *Times*. It follows that the contingency of a naval force originally inferior being

so reinforced as to become superior to its adversary must never be lost sight of by the latter. If England is ever at war with two allied naval Powers she must never rest her security on the precarious contingency of being able to defeat the fleets of one before the fleets of the other have come to the assistance of their allies. She must recognise that the junction of the allied fleets cannot in all contingencies be prevented by a force superior to either, but inferior to both combined, and must therefore be prepared to meet both at least on equal terms.

A further comment of the *Times* taken from the same article would seem to be not less worthy of attention :—" So much for the broad strategical lesson to be learnt from the manœuvres of 1896. The by-products, as we have called them, were full of varied instruction. Of these the first we have to mention was of a negative character. Neither side appears to us to have made any very novel or very effective use of its cruisers. The ambiguities and perplexities of the rules may have had something to do with this, but the fact remains that the effective employment of cruisers seems to be still very imperfectly understood, and not perhaps to have been studied with all the attention it demands. A further result of the manœuvres, which is, in our judgment, of the utmost importance and significance, is the complete ascendency which appears to have been established by the destroyer over the torpedo-boat. 'Practically,' wrote our correspondent with the Reserve Fleet, 'the torpedo-boats dared not venture out of port because of the destroyers, which waited outside and kept the seas even when a gale was blowing.' If this is even an approximation to the realities of the case and not merely a result of rules arbitrarily and unfairly framed, it is plain that the game of the torpedo-boat is already up. The destroyer has beaten it out of the field. We should hesitate as yet to regard this conclusion as established, but the evidence points very strongly in that direction. Certainly the torpedo-boats seem to have been nowhere in the manœuvres of 1896. The field of operations was swarming with hostile cruisers, and yet only one claim was, so far as we know, recorded, and this was disallowed by the umpires. If the torpedo-boats cannot get out because of the destroyers, and if when they do get out they can do no better than this, it needs no prophet to predict that their menace, often so greatly exaggerated, will very soon be appreciated in all quarters at its true value."

Some subsidiary lessons.

There is not much to be added to this commentary on the secondary operations connected with the manœuvres. But it is as well to bear in mind that manœuvres are not war, and therefore that the lessons suggested by them are in all cases peculiarly in need, and yet, in the

False confidence to be deprecated.

case of torpedo-boats, entirely devoid of corrections derived from the experience of actual warfare. A false confidence may only too easily be engendered by the artificial conventions and prudential restrictions necessarily imposed in manœuvres. So far as war experience goes the torpedo-boat, and still more the destroyer, is as yet almost an untried weapon. Until the capacities and limitations of both have been determined by actual warfare the only prudent course for this country is to rate at its highest the offensive capacity of the torpedo-boat, and at its lowest the defensive capacity of the destroyer.

II. France.

The following account of the French Naval Manœuvres is condensed from the Journal of The Royal United Service Institution for August and September 1896 :—

Scheme of operations.

The following was the composition of the fleet as organised for this year's grand manœuvres in the Mediterranean.

ACTIVE FLEET.

Vice-Admiral Gervais in command.

Battle-ships.

1st Division.	*2nd Division.*	*3rd Division.*
Brennus (flag of Commander-in-Chief).	Dévastation (flag of Rear-Admiral Pottier).	Magenta (flag of Rear-Admiral MacGuckin de Slane).
Marceau.	Redoubtable.	Courbet.
Amiral-Baudin.		

Cruisers.

Rear-Admiral Fournier in command.

1st Division.	*2nd Division.*	*3rd Division.*
Amiral-Charner (flag of Rear-Admiral Fournier).	Latouche-Tréville.	Chanzy.
Wattignies.	Suchet.	Troude.
D'Iberville.	Faucon.	Vautour.
Bugeaud.	Casabianca.	

Torpedo-boats.

1st Group.—Flibustier, Éclair.
2nd Group.—Sarrazin, Tourmente.
3rd Group.—Kabyle, Agile.

RESERVE FLEET.

Vice-Admiral Cavelier de Cuverville in command.

Battle-ships.

1st Division.	*2nd Division.*
Amiral-Duperré (flag of Commander-in-Chief).	Friedland (flag of Rear-Admiral Turquet de Beauregard).
Caïman.	Terrible.

RESERVE FLEET—*Continued.*

CRUISERS.

1st Division.	*2nd Division.*
Cécille.	Sfax.
Lalande.	Milan.
Léger.	

TORPEDO-BOATS.

1st Group.—Audacieux, Aventurier.
2nd Group.—Orage, Chevalier.

TORPEDO-BOATS OF DÉFENSE-MOBILE.

District of Toulon — 8 boats.
,, Corsica — 7 ,,
,, Algeria — 9 ,,

Total number of vessels taking part in the manœuvres, 61, carrying 12,400 men.

The manœuvres were divided into three periods:

First period extending from 6th to 14th July.
Second ,, ,, 15th ,, 21st ,,
Third ,, ,, 21st ,, 30th ,,

During the first period the squadrons were exercised at quarters and in fleet evolutions, and there were various operations in which torpedo-boats took part. First period.

July 17th.—The Active Squadron was divided into two squadrons: A, under Vice-Admiral Gervais; and E, under Rear-Admiral de Slane; and the Reserve Squadron at Ajaccio, under Vice-Admiral de Cuverville, was renamed B Squadron. The following was the plan of operations:—E Squadron, being stronger than A, blockades the latter, which succeeds by means of the semaphore stations in calling in the assistance of B Squadron from Ajaccio, and the cruisers of A Squadron succeed in drawing away E so as to allow A and B to make a junction. Second period.

July 18th.—A and B having combined sent out their cruisers to scout and endeavour to bring E to action, but the latter was able to elude them and arrive at the pre-arranged rendezvous, where later in the day all three squadrons united and were re-organised as one fleet under Admiral Gervais.

July 19th and 20th.—Evolutions were carried out by the combined fleet, and at 2 P.M., on 20th, the ships dispersed to take up pre-arranged anchorages at the three Algerian ports of Bona, Philippeville, and Algiers, and prepare for the third and concluding period of the manœuvres.

The fleet was now organised afresh in two squadrons, A and B, under Vice-Admirals Gervais and de Cuverville respectively. Third period.

A SQUADRON.

1st Division.	2nd Division.
Brennus (flag of Commander-in-Chief).	Dévastation.
Marceau.	Redoubtable.
Amiral-Baudin.	Courbet.

CRUISERS.

1st Division.	2nd Division.	3rd Division.
Amiral-Charner.	Latouche-Tréville.	Troude.
Bugeaud.	Suchet.	Lévrier.
Wattignies.	Faucon.	
D'Iberville.	Casabianca.	

B SQUADRON.

1st Division.	2nd Division.
Amiral-Duperré (flag of Commander-in-Chief).	Magenta.
Caïman.	Neptune.
Terrible.	

CRUISERS.

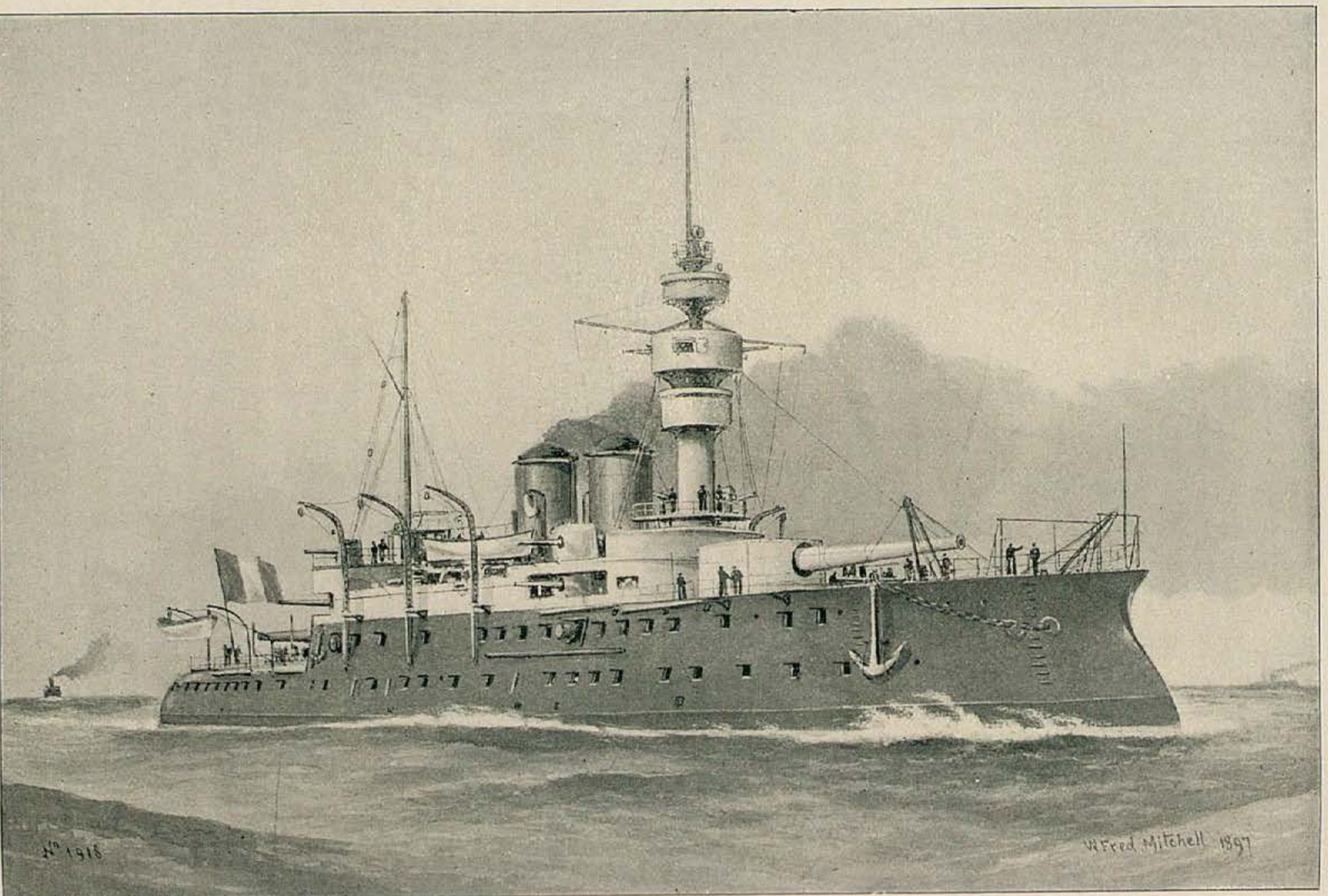
1st Division.	2nd Division.	3rd Division.
Chanzy.	Lalande.	Léger.
Cécille.	Milan.	Couleuvrine.
Sfax.	Sfax.	

Squadron B, representing the enemy, was anchored at Algiers; while the defending force A was anchored off Philippeville.

July 25th.—The two squadrons A and B quitted the Algerian ports to commence the third period of the manœuvres, the plan of the operations being given as follows:—

"An enemy's fleet from Algeria attempts to bombard the coast of Provence, endeavours are to be made to stop it *en route* and then to fall back on the coast for its defence."

The French or Defending Squadron "A," under the command of Vice-Admiral Gervais, was lying at Bougie and Philippeville, on the Algerian coast, when hostilities broke out; and the enemy "B," under the command of Vice-Admiral de Cuverville, was anchored at Algiers and Dellys, which were his coaling stations and bases of operations. The coast-defences and torpedo-boats of the Défenses-Mobiles of Toulon and Corsica were also mobilised for the defence of the coasts of Provence and Corsica. On the declaration of war, Admiral de Cuverville started his cruisers and two fastest battle-ships, the Magenta and Neptune, under Rear-Admiral de Slane, to ravage the coasts of Provence, while he followed with the main body of his squadron, his idea apparently being to draw the French Defending Squadron from the Algerian coast to defend the coasts of Provence and Corsica. In this he partially succeeded; Rear-Admiral Fournier, who pursued with the fast cruisers of the "A" Squadron, only getting into touch with Rear-Admiral de Slane after the latter had destroyed the signal-stations along the coast between St.



"BOUVINES,"
FRENCH BATTLESHIP.

Marguerite and Mont Boron and bombarded various coast towns; not finding himself strong enough to interfere with the enemy's movements, Rear-Admiral Fournier rejoined Admiral Gervais, who in the meantime had detached the Redoubtable and Bugeaud to destroy the enemy's coaling station at Dellys. This was accomplished after some hours' fighting, the Redoubtable, however, losing two-thirds of her fighting value. No meeting took place between the squadrons; but Admiral de Cuverville, in spite of his successful raid, has been adjudged to have been defeated, as his coaling base having been destroyed, the ultimate capture of his fleet was considered certain.

The manœuvres in the Channel were carried out by the Squadron of the North between the 6th and 26th July, strengthened by four sea-going torpedo-boats mobilised at Brest and Cherbourg, and the Défenses-Mobiles of the four arrondissements of Cherbourg, Brest, Lorient, and Rochefort. The squadron, under the command of Vice-Admiral de Premésnil, consisted of the following ships:— **Channel manœuvres.**

First-class battle-ship—Hoche (flag of Commander-in-Chief).

Coast-defence battle-ships—Bouvines (flag of Rear-Admiral de Courthille), Tréhouart, Valmy, Jemmapes.

First-class armoured cruiser—Dupuy-de-Lôme.

Second-class cruisers—Friant, Chasseloup-Laubat.

Third-class cruiser—Coëtlogon.

Torpedo-cruiser—Épervier.

Torpedo-avisos—Lance, Salve.

The manœuvres were divided into three periods. The first and second periods were occupied mainly with drills and evolutionary exercises.

For the third period the squadron was reconstituted into three divisions, the first two of which, under the command of the Vice-Admiral, formed the defending force, composed as follows:—

First Division (A 1)—Hoche, Tréhouart, Friant, Lance.

Second Division (A 2)—Valmy, Jemmapes, Chasseloup-Laubat, Salve.

Third Division (B) representing the enemy under the command of the Rear-Admiral—Bouvines, Dupuy-de-Lôme, Coëtlogon.

The torpedo-boats of the squadron were formed into a Light Division under the leadership of the Épervier, and were attached the defending squadron.

The scheme of operations was as follows, and was practically the same as has been carried out in some previous years, viz., an enemy's squadron, after entering the Channel, was to endeavour to bombard the coast and at the same time avoid an action with the defending fleet. Division B was to be at Dunkerque on the morning of the

22nd July; Division A 1 at Brest on the morning of the 23rd; Division A 2 at Cherbourg on the same date; and the Epervier with her torpedo-flotilla either at Boulogne or Calais on the evening of the 22nd. The speed of the defending vessels was restricted to 11 knots, that of the attacking force to 12. The operations commenced at midnight on the 24th-25th. Admiral Courthille being aware that the defending squadron was divided, his object was to prevent their junction if possible; he was not allowed to attack Cherbourg, but if on arrival off that port he found that A 2 had left, he could either pursue it or bombard the coast between Dunkerque and Brest.

The accounts of what actually happened are extremely meagre. The enemy appear to have passed Calais during the forenoon of the 25th, arriving before Cherbourg about midnight, off which port he cruised until the morning, when he disappeared, steering to the W.N.W. The Second Division A 2, leaving Cherbourg a little after midnight on the morning of the 25th, effected a junction with A 1 to the north of Batz about 11.30 P.M. of the same day; A 1 having left Brest at 5 P.M. that afternoon. Squadron A having then received reports from the signal stations at La Hague and Cape Levi, shaped course to the East and came in touch with the enemy on the morning of the 27th, who, however, soon disappeared from sight again, steering to the West. Eventually, on the evening of the 28th, Rear-Admiral de Courthille arrived at Cherbourg, signalling that the manœuvres had ended.

Detailed comment precluded by lack of material.

The above account is taken from several French sources, but the information afforded is unusually lacking in detail, and hardly seems to afford adequate material for a comprehensive survey of the scope and character of the operations. Foreign navies, like our own, generally engage in a series of evolutionary exercises for a longer or shorter period, anterior to the strategic manœuvres proper. Such exercises are seldom reported in sufficient detail to afford an opportunity for profitable criticism, nor could criticism be of much value in any case unless it proceeded from an eye-witness professionally qualified and familiar with the executive methods and traditions of the particular navy concerned. Three operations of the French fleets, however, appear to present some features of general strategic interest.

Second period of Mediterranean manœuvres.

In the second period of the Mediterranean manœuvres two allied squadrons, A and B, were stationed respectively at Hyères and Ajaccio, distant apart some 120 miles. A third squadron, E, superior to both A and B separately, but inferior to the two combined, was at large in the portion of the Mediterranean defined by Corsica, the Balearic Islands, and the coast of Provence. Squadron E was composed of the

battle-ships Magenta, Redoubtable, Dévastation, and Courbet, taken from the Active fleet, of the cruisers Faucon and Vautour, and of four sea-going torpedo-boats, the Aventurier, Éclair, Kabyle, and Sarrazin. Squadron B consisted of the Reserve Fleet, the battle-ship Friedland being, however, disabled, and the cruiser Milan detached to convoy the injured torpedo-boat Chevalier to Toulon. Squadron A consisted of what was left of the Active Fleet after the formation of Squadron E. It does not appear that A was actually blockaded by E. It was informed that E was at sea and in superior force, and communications were opened with B for the purpose of effecting a junction at sea between A and B.

Desperate position of E.

The position of E would seem to have been a desperate one from the first. It was as if a hostile squadron had ventured into the Irish Sea with the North Channel barred, while two British fleets, collectively superior to it, were stationed respectively at Milford Haven and Dublin Bay, assumed to be fortified harbours. E could not attempt to blockade either Hyères or Ajaccio, because, these two stations being in communication with each other, the blockade of either could be raised by the allied fleet coming from the other. E was, moreover, deplorably deficient in cruisers, while its adversaries were comparatively well supplied. It seems certain that a fleet in so desperate a position must sooner or later be discovered, overtaken, and defeated. The distance between Hyères and Ajaccio is so insignificant that a junction between the two allied fleets could have presented no difficulty whatever. It would have been more difficult for them to miss each other than to meet. They could meet at any point between the two by starting at a preconcerted time and steaming at a prescribed speed; and a close blockade being out of the question for the reasons given above, it is evident that A and B could at any time leave their anchorages during the night and steam for a convenient rendezvous, which E, with its slender supply of cruisers, would be very unlikely to discover before the junction was effected. But not even this semblance of actuality was given to the proceedings. No sooner had E left the anchorage at Hyères and, having attained an offing to the southward, assumed the hostile character assigned to it, than a signal was made to A, lying in the same anchorage: "Enemy in sight." A's cruisers were forthwith sent out in two lines, one to keep touch with E, the other to establish communications with the advanced cruisers of B, which would appear to have quitted Ajaccio simultaneously. It would seem that if E could be observed by the scouts of A, E, by chasing A's scouts, might have fallen upon A while B was too far off to be able to render assistance. But as this was not done, it may be conjectured that A's dispositions were such as to frustrate

such a manœuvre. At daybreak on the following morning all three fleets were in sight of each other, A and B having effected their junction during the night. E was separated from its cruisers and surrounded by A and B, and the operation thus terminated with the discomfiture of E—a conclusion which would appear to have been practically preordained.

Obscurities of the situation.

It is not easy to understand what object E proposed to itself or what object was assigned to it by the authorities who projected the operations. It could hardly have been an offensive object because E, having quitted Hyères, appears to have steamed away from that anchorage, where one of its opponents was stationed, and not to have made direct for Ajaccio, where the other was known to be. E left Hyères at 10.15 A.M., and was signalled about noon as an "enemy in sight" from Porquerolles, a signal station in the immediate neighbourhood of the anchorage, and in direct communication with A. A left at 1.20 P.M. Thus, although E was very inadequately supplied with cruisers, it would hardly seem to have been beyond its power to have ascertained the departure of A from an anchorage only three hours distant, and to have endeavoured to intercept it. Not to attempt this was to take no advantage of its temporary and local superiority, and to give A and B every opportunity of establishing their own superiority by effecting a junction. As soon as this junction was effected, and unless it could be prevented, the discovery and defeat of E could only be a question of time. It may be that the only purpose of the operation was to ascertain whether A could, by means of its cruisers, simultaneously keep touch with E and join hands with B. If E was not to act on the offensive, there would seem to be no great difficulty but at the same time no very obvious advantage in effecting such a purpose successfully. On the other hand, if E was free to act on the offensive, it is not easy to understand why no attempt was made to prevent the exit of A, or to bring that fleet to an action as near to Hyères as possible, and therefore as far as possible from the point of junction between A and B.

Third period of the operations.

In the third period of the manœuvres an enemy's fleet now called B, and differing in composition from the fleet previously designated as B, was assumed to have established itself on the coast of Provence, and to be carrying out such hostile operations against the shore as are open to an unmolested fleet temporarily established in such a position. The general situation at the outset seems to have been somewhat more complicated than is described in the summary given above. Both fleets were originally stationed on the Algerian coast, B at Algiers and A at Philippeville, the coast from Algiers westward being assumed to belong to B, and that from

Algiers eastward as well as the coast of Provence being assumed to belong to A. B originally put to sea in two squadrons, which were subsequently reunited off the coast of Provence. A, having its own portion of the African coast to protect, seems to have considered itself tied to that region until it had ascertained that an attack in that direction was not contemplated by B. In the meanwhile B pushed forward one of its divisions for the attack on the coast of Provence and retained the other at sea for several days in the neighbourhood of the Balearic Islands, almost entirely eluding the observation of A's cruisers. B was ultimately pursued by A, but the operations appear to have been brought to a close before any decisive engagement could be fought. Nevertheless, as A, before leaving the African coast, had attacked and destroyed the coaling station supposed to have been established there by B, the final decision of the umpires was given against B, as, being deprived of its coaling base, its destruction or capture could only be a question of time.

The scheme of operations little consonant with the conditions of actual warfare.

In this scheme of operations the conditions which govern actual warfare would seem to have been disregarded in some important respects. The idea evidently is that an enemy has entered the Mediterranean from the Atlantic, and, having provided himself with a coaling base somewhere in the neighbourhood of Gibraltar, is simultaneously threatening the coasts of Algeria and the coasts of France, that is, the French possessions on both sides of the Mediterranean. It is probable that no enemy who knew his business would even attempt to do anything of the kind. If he entered the Mediterranean at all, it would be for the purpose of seeking out the French fleet, and, if possible, of bringing it to an action, or, failing that, of sealing it up in its ports. If he was not strong enough to do this, he would certainly not be strong enough to attack French territory with purely maritime appliances so long as the French fleet was at large. Least of all would he undertake an enterprise at once so desperate and so futile, unless he was provided with a convenient coaling base, practically impregnable to all forms of maritime attack.

Further criticism of the scheme of operations.

The general principle here involved will be more conveniently considered in the discussion of the Italian manœuvres in a later section of this chapter. It suffices to say here that it is hardly conceivable that an enemy entering the Mediterranean in strength sufficient to enable him to dispute the command of that sea with the French fleet would pursue any other object in the first instance than that of establishing his own command of the sea immediately in dispute. That being done, he holds in his hand, actually or potentially, every object for which naval warfare can be waged.

Until it is done he can pursue no other object which is or can be in any way commensurate with the means he is employing to attain it. If he is not strong enough to fight the French fleet in the open with a reasonable prospect of success he is certain to be driven out of the sea in dispute sooner or later, unless, which is perhaps more probable, his fleet is either captured or destroyed. If he is strong enough to fight it, the effect he could produce by doing so must be immeasurably greater than any he could hope to produce by purely maritime attack on his enemy's coasts. This mode of attack produced no results worth considering in the war of 1870. It was almost equally fruitless in the Crimean War. These two cases probably represent a *maximum* of naval supremacy on the side of the maritime assailant. If, with maritime supremacy absolutely established, the results are so insignificant, the conclusion is irresistible that so long as maritime supremacy is in dispute they must be positively infinitesimal. The calculus has yet to be invented which can express the objects of naval warfare in terms of the destruction of signal stations. It is true that the operation of "ravaging coasts," as it is called, is supposed to mean a great deal more than this. But so far the experiment has only been tried on the principle of "*tu pulsas ego vapulo tantum*." * When it is tried under the real conditions of actual warfare, it will probably be found that, in default of an assured command of the sea, the shore and its defences, fixed and mobile, natural and improvised, are about the most formidable or at any rate the least assailable adversaries that a warship can encounter.

Criticism continued. But, even assuming that the operations under consideration were based on sound strategic principles, the dispositions of the A fleet would still be open to criticism. A hostile fleet was supposed to be at large in the Mediterranean and to be bent on ravaging the coasts either of Algeria or of Provence or of both. The A fleet was on the Algerian coast and there it stayed until it was assured that the enemy had gone elsewhere and that Algeria was not likely to be attacked. Now by the hypothesis the alternative objects of attack were practically the coasts of Provence and the coasts of Algeria. Manifestly of these two the coasts of Provence were, as belonging to the central territory of France, by far the more important. If it was impossible to protect both simultaneously, it was surely the first duty of the national fleet to protect the national territory proper. Even on the assumption that the proper function of a sea-going fleet is directly to protect the coasts belonging to the nation it serves, it is surely altogether beyond the bounds of probability that the French

* "You hit and I don't hit back."

fleet, menaced by the entry of a hostile fleet into the Mediterranean, would leave the coasts of France unprotected in order to protect the coasts of Algeria. It is true that by remaining in the rear of the enemy the A fleet was enabled to destroy his coaling station and thereby to reduce him to impotence. But the ease with which this was done imputes to the enemy an offensive policy which was positively fatuous in the circumstances, and thereby deprives the whole proceeding of all strategic actuality. No enemy would dream of acting on the offensive far away from his base unless his coal supply was absolutely secure. The thing is strategically as unthinkable as that he should deliberately run his fleet ashore. Indeed a warship without coal and still afloat is in even a more "parlous state" than if it were ashore. Afloat it can be sunk, ashore it can only be captured. But as no one supposes it possible that a naval commander acting on the offensive should, while still retaining his senses, run his fleet ashore, so it is equally incredible that he should run the slightest risk of having to fight an action with his bunkers empty. Hence although the operations of the third period of the Mediterranean manœuvres may have been profitable as evolutionary exercises—in which aspect they are not considered here—and as an experiment in coal endurance, in which regard they seem to have yielded some very significant results, it is impossible to say that they exhibit much real insight into the stern logic of actual warfare.

Different views entertained abroad.

It needs hardly be said that the foregoing criticism applies only to the theory of the operations of the French Mediterranean fleet and not in any sense to their practical execution in detail. The theory appears to the present writer to be unsound in principle and disallowed by all the lessons of naval history. He can only give his opinion for what it is worth, and acknowledge at the same time that the problem of naval warfare appears to be very differently conceived by many high authorities abroad.

The French Channel manœuvres.

The strategic operations involved in the French Channel manœuvres appear to have been conceived in the same order of ideas as the third period of the Mediterranean manœuvres. A hostile squadron was supposed to enter the Channel through the Straits of Dover and to "ravage" the French coasts. The defending force was divided into two squadrons, each inferior to the enemy in detail, but superior in combination, one stationed at Cherbourg, the other at Brest. The enemy effected his entry and appeared off Cherbourg, which he was not allowed to attack, but not in time to prevent the exit of the defending squadron stationed there. This squadron effected its junction with the squadron coming from Brest, and the two combined

then proceeded to the pursuit of the enemy. But the speed of the latter being superior, he succeeded in effecting his escape. There were the usual "alarms and excursions" characteristic of this mode of operation, but the details are meagre; and even if they were abundant, the nature of the proceedings is scarcely such as to afford scope for profitable comment. Whether the French naval authorities really hold that the attack of coasts is the proper and primary function of a sea-going fleet, or only regard the proceeding as a convenient method of enlarging the sea-going experience of the officers and crews engaged in it, is a question which cannot be determined. The important points for independent critics to bear in mind are that coast attack is essentially a subsidiary and not a primary object of naval warfare proper; that the best defence against it is the sea supremacy of the nation whose coasts are threatened; that where sea supremacy exists, coast defence proper, apart from the adequate protection of naval bases and coaling stations, is very little needed, and, so far as it is needed, is mainly a military and not a naval function; and, above all, that the only form of coast attack which is likely to affect the supreme issues of war is that in which, sea supremacy having first been established, the naval arm co-operates with the military for the purpose of organised invasion.

III.—Italy.

The following account of the Italian manœuvres is compiled from official sources by the well-known writer who adopts the signature of "Jack La Bolina":—

Problem to be solved.

The Italian Naval Manœuvres were of short duration and may be divided into two distinct parts. The second consisted of tactical manœuvres. The first part, which we shall here try to analyse, is the most interesting, owing to the light it threw upon the strategic problem of the defence of a naval frontier, and owing to the fact that the operations presented as close a resemblance as possible to the realities of actual warfare. In this case the frontier was our western coast, which had to be defended against the attack of a naval force bent on getting absolute control of the northern section of the Tyrrhenian waters, the coast of the mainland, and the adjacent islands. The attacking fleet, which, when intact, was considered to be stronger than the defensive one, was, notwithstanding, divided into two squadrons which, at the beginning of hostilities, were to be widely separated one from the other whilst the opposite forces were to be kept united in an intermediate locality. Moreover, each of the squadrons of the attacking fleet was to be considered inferior in force



"MARCO POLO,"

ITALIAN CRUISER.

to the whole defensive one. Thus the complete solution of the problem proposed could only be attained in two successive periods. In the first period the two sections of the attacking fleet must try to effect a junction, so as to form one tactical force stronger than the one constituted by the defence, while the latter must endeavour to prevent the junction of the two sections of the adversary's fleet. In the second period the attacking fleet now united had to attempt operations such as landing of parties along the coast-line with the aim of destroying railway-bridges, semaphores, and shelling towns so as to draw out the defensive forces to the open sea; while the defending fleet had to protect the works on the coast-line and especially the railways, watching for any opportunity of separately beating off the adversary's forces.

Composition of fleets. The composition and stations of the opposing forces were as follows: The two sections of the Yellow or attacking side, which, at the beginning of hostilities, were respectively stationed, one in the Bay of Vado, the other in the Gulf of Cagliari, were composed as follows:—

At *Vado*:—Two first-class ships, Re Umberto and Lepanto; two second-class, Fieramosca and Catalafimi; and two divisions of torpedo-boats.

At *Cagliari*:—Two first-class ships, Italia and Lauria; two second-class, Stromboli and Euridice; and one division of torpedo-boats.

The ships of the defensive, or Green side, were lying at the Island of Maddalena, and consisted of four first-class ships, Sicilia, Sardegna, Morosini, and Doria; one third-class, Marco Polo; four cruisers of different classes, Piemonte, Bausan, Tripoli and Partenope; three divisions of torpedo-boats. To these were added the torpedo-boat transport Trinacria, and a merchant steamer laden with fuel.

General conditions. As in simulated warfare, no decisive results can be actually attained, certain conditions must be laid down beforehand so as to avoid confusion, and to keep the operations within the limits of some predetermined criteria. By these restrictions alone can simulated war be regulated and made to yield the desired practical result of throwing light on those sides of the problem which require special illustration. The theme fixed upon on the present occasion was intended, in fact, to study the most elementary operations in naval warfare, namely, the discovery of the enemy. The narrow waters where the manœuvres were to take place afforded an excellent field and capital means for an accurate study of the opportunities afforded by the use of the semaphores in connection with the cruising of the fleets in all that regards the operations of scouts and look-outs. The waters in which the two fleets were to operate were limited, north, by the line uniting Capo Mele with Capo Corso, and south by

the meridian of Capo Spartivento in Sardinia. All the semaphores situated on the mainland in the Upper Tyrrhenian Sea and on the adjacent islands were naturally in the service of the Green side, with the exception of three. The semaphores of Capo Mele and Capo Noli on the mainland, and that on Capo Comino in Sardinia, belonged to the Yellow party. It was, moreover, arranged that carrier pigeons should be used for the transmission of news from the ships to the General Staff Office in Rome; and accordingly a sufficient number of them were sent from the Roman pigeon-house on board the flag-ships.

Rules. Regulations of remarkable simplicity regulated the terms of the attacking party's action. Tactical operations were strictly forbidden so that wherever ships of the opposite sides confronted each other, the result was determined by the conventional superiority of one of the sides over the other. The conventional superiority of ships and fleets was determined as follows: To all units of the first class was assigned the value of 1; to smaller ships the value was represented by fractions gradually decreasing. Each division of torpedo-boats was considered equivalent to a second-class cruiser, so long as the division could develop its maximum of tactical efficiency; namely, during the first 24 hours of actual service. As it is well known that torpedo-boats gradually lose their tactical power and the crews their energy, it was decided to lower their value gradually, so as to reduce it to *nil* after 72 hours continuous cruising service. It was accordingly agreed that after performing 72 hours cruising all torpedo-boats, of both sides, were to return to port and remain there 24 hours before resuming work again.

As regards tactical contact between opposing units, the rule was this. In daytime an intervening distance of 3000 metres was accepted as the *maximum;* during the night the corresponding distance was that at which the two vessels were in each other's sight. In order to render the practical execution of scouting operations for the discovery of the enemy as rational and profitable as possible, and in order that the encounter of forces opposed to each other might be the result of dispositions deliberately made as the fruit of mature consideration, and not come about by simple chance or by a stroke of good luck, it was decided that the ships could not surpass a given limit of speed. Thus, 10 knots was the limit fixed upon for the ships belonging to the Green side, 8 for the Yellow side, and 12 for the smaller ships and torpedo-boats of both parties. During the second period, however, when the junction of the two fractions of the Yellow Fleet was supposed to have taken place, and their object would then be to discover the adversary so as to bring him to an

action and destroy him, the conditions of speed were necessarily reversed, and it was accordingly settled that in the daytime the speed of the Yellow Fleet should be 10 knots, whilst that of the Green would be only 8. During the night the original conditions were not changed because then it was the Green side's turn to discover their enemies and prevent them from doing damage along the coast. Moreover, special rules were laid down to determine when a semaphore, a railway work or a submarine telegraph cable should be considered damaged or completely destroyed; and other rules were also made to determine the effect produced by the shelling of undefended towns.

The supreme control of the whole of the operations was entrusted to Admiral H.R.H. the Duke of Genoa, who hoisted his flag on board the royal yacht Savoia. On board of each of the first- and second-class ships an officer was told off as umpire, in order to avoid, as far as possible, any controversy concerning the operations of those ships; and also to facilitate the task of the superior authorities with whom the final decision rested.

First Period of Operations.

As soon as hostilities were declared the two fleets went cruising each in the waters fixed upon by the special instructions issued to each commander-in-chief, detaching their fast cruisers to scout for the enemy. The greater part of the Green Fleet moved towards the Tuscan Archipelago, stationing minor vessels and torpedo-boats across the two channels through which the enemy must pass. The task of the commander-in-chief of the Yellow Fleet, who commanded the first squadron in person, was to elude the vigilance of the adversary's fleet and to effect a junction at sea with the second squadron stationed at Cagliari. The task of this latter squadron consisted in occupying the waters south of Elba under the pretence of attempting to reach the north of the island, but in fact keeping the nucleus of its forces along a line near which the first squadron (stationed at Vado) would have made its junction in the event of its having successfully run the gauntlet of the enemy's forces.

Hostilities were declared by the director of the manœuvres on the morning of the 26th of August, at ten o'clock, and at this hour the two fleets simultaneously put to sea. The Green Fleet thought fit to wait for its adversary in the narrowest part of its cruising-ground; the Yellow decided to temporize, considering that the conditions of weather which prevailed at the time—the clear atmosphere and the full moon at night—were unfavourable to its movements. The 27th and 28th were accordingly spent in simple cruises without presenting any feature of remarkable interest with the exception of some encounters between the advanced cruisers of both fleets.

On the fourth day the whole of the Green Fleet initiated a move towards N.W., bent on the discovery of the first squadron of the enemy, steaming in line abreast, each ship being widely separated from its neighbours. The torpedo-boats, escorted by the Trinacria on the right of the line, stood away by some points towards Genoa so as to watch the sea along the coast. During the afternoon, a little before three o'clock, the two fleets sighted each other from the masthead. The first squadron of the Yellow side was heading towards Elba. This squadron, which, as regards force, was inferior to the Green, tried by altering course to escape; but, in view of the difference of speed of the two fleets (which was all to the Green's advantage), the relative position of the ships, and last of all the narrow space of water in which the action took place, the Yellow commander-in-chief decided to return to his former station at Vado, which was considered a fortified harbour. Towards eight o'clock the Yellow fleet came to anchor, and soon after the Green was off Vado as if to blockade that port. On the morning of the 30th, by order of the Director of the Manœuvres, the hostilities were suspended, an armistice was declared, and in accordance with orders issued beforehand, each fleet returned to an assigned station, viz., the Yellow to Gaeta, and the Green to S. Stefano.

Second Period.

The conception of the second period of the manœuvres was a natural consequence of the solution of the preceding one. After the junction of the two sections of the Yellow side, the whole fleet aimed at the destroying of the Green one so as to obtain absolute control of the field of operation. The campaign lasted five days, viz., from the night of the 3rd of September to the 8th. The smaller vessels and torpedo-boats were detached from the Yellow Fleet on special missions intended to damage the seaside railways in several localities, whilst the more powerful ships, under the direct command of the admiral commander-in-chief, cruised in suitable localities to assist the action of the detached tactical units. Holding a threatening position and having at his command considerable forces, the admiral could, on an emergency, move towards his adversary if the latter showed any intention of molesting his cruisers during the fulfilment of their mission. He would probably succeed in dispersing the enemy, in bombarding the undefended seaside towns, and in drawing out the enemy's forces to a decisive engagement. On the other side, the movements of the Green Fleet were meant to prevent or disturb the Yellow cruisers' operations, molesting them in all possible ways, but persistently trying to avoid meeting the main body. In order to successfully effect such a design, a powerful group of the Greens should have been kept in hand so

as to represent a tactical force capable of decisive fighting against the separate detached sections of the Yellows whenever favourable circumstances should occur. But the Greens wanted more cruisers than they could muster, and they ought to have sent out those they had in contact with the Yellow's main body, to watch its movements and to obtain such exact information as might serve to determine the dispositions of the Green commander.

Among the several partial operations of the Yellow side some deserve special mention. The cruiser Fieramosca destroyed the semaphore of Gorgona Island and damaged several works along the Gulf of Genoa, blowing up some railway-bridges and tunnels. The first division of Yellow's torpedo-boats succeeded in destroying the semaphore at Pianosa Island, and cut the telegraphic cable uniting Elba to the continent. On the morning of September the 5th, the main body of the Yellows shelled, quite unmolested by the opposite forces, the town of Civita Vecchia. On the 6th the cruisers Stromboli and Euridice cut the cable from Elba to Capraja, while the main body of the Yellow Fleet leisurely bombarded Porto Ferrajo. Next day the Stromboli dismantled the semaphore of Capraja. Often during this second period the cruisers of opposite sides were in a position to chase their opponents. Only twice was there tactical contact—first, during the night of the 5th, off the island of Giglio, with decided advantage to a Yellow torpedo-boat division, and again on the 6th, not far from Capo Noli, when the Yellow cruiser Fieramosca met the Green cruiser Bausan, supported by a division of torpedo-boats, and this time success was with the Greens. At noon of the eighth day the hostilities ceased, and all the ships of both fleets returned to Spezia. **Operations of cruisers.**

The conclusions drawn from the Italian manœuvres of 1896, by Rear-Admiral C. De Amezaga, Royal Naval Reserve, who was present on board the Elba, may be quoted here. They were as follows:— **Conclusions of Admiral De Amezaga.**

"1st. The manœuvres confirm the continued existence of several inconveniences revealed by the manœuvres of past years.

"2nd. There is no better school than the exercises of opposing fleets be they on a small or large scale.

"3rd. The really practical system of mobilization consists in the permanent commissioning of all available ships, since it fulfils not only the military requirements, but also keeps a very costly material in good and efficient condition.

"4th. In order to meet sudden political complications it is absolutely necessary to increase annually the number of naval recruits.

"5th. We are extremely deficient in piers provided for the direct

loading of fuel on board ships, even in our great arsenal of Spezia. Moreover, our fleet lacks coaling-ships adapted to the necessities of modern naval warfare.

"6th. It is necessary to provide in a short time for a system of coast defence. This must be rational, and in harmony with the system employed by the Royal Army, which, for the defence of the shore, answers sufficiently well.

"7th. The second-class torpedo-boats, that is, those under 100 tons, must not follow the fleets, except in cases of exceptional service, always involving proximity to the shore. Small torpedo-boats cannot act successfully without the concurrence of army-movements.

"8th. All torpedo-boats now used as tenders to battle-ships and cruisers must be replaced by destroyers of great speed.

"9th. Notwithstanding the excellent qualities of our ships, these are too few for the defence of Italy and for the exigencies of the political situation. The want of battle-ships is deeply felt; the cruisers for service abroad are too few.

"10th. The semaphore service, although infinitely better than in 1893, must be further improved. We want in time of war special links with the telegraphic net-work.

"11th. It is advisable to extend the use of carrier-pigeons for the purpose of conveying intelligence, as they proved good auxiliaries of the semaphore service.

"12th. A wider employment of the *personnel* of the Royal Naval reserve is advisable, and its regulations should be reformed.

"13th. We must absolutely avoid the objectionable practice of recruiting landsmen, in order not to have on board sea-sick men. On board ships and torpedo-boats in commission the crew must be picked from sailors who have been serving in the merchant service for a longer period than the one required by law.

"14th. Petty officers must be chosen among the best seamen belonging to the annual draft.

"15th. A new law for regulating promotion among naval officers should supersede the present one.

"16th. I believe that at whatever pecuniary sacrifice the Government must keep in commission most of the ships, sending out many in effective and real cruises."

Conclusions of Jack la Bolina.

In these and previous naval manœuvres in past years, the side engaged in the defence has always succumbed to its adversary. This shows that whenever the two sides are of about equal force, the one entrusted with the defence cannot fulfil its task with a chance of success. This must convince Italy that her naval forces are below the minimum required as regards quantity. Be it remarked that

the side of the offence limited its operations to the western coast of Italy. The Sicilian waters and the whole of the Adriatic have been considered as safe. But on what grounds? No one can admit of offensive operations restrained to one side of the peninsula. We must therefore provide for the safety of the whole of our coast-line. This must lead to an increase of our forces, swelling the navy estimates at the expense of those of the army.

Difficulties of the Yellow Commander.

In the first part of the operations described above the task imposed on the Yellow Commander was manifestly one of extreme difficulty. He had at his disposal two squadrons originally stationed some 350 miles apart, his own at Vado Bay on the Italian Riviera, some twenty miles west of Genoa, the other at Cagliari on the south-eastern coast of Sardinia. Each of these was inferior to the hostile Green Fleet which, being stationed at Maddalena, occupied an interior position between the two; and while a *maximum* speed of ten knots was assigned to the latter the speed of the two Yellow Squadrons was limited to eight knots. The field of operations was restricted in its northern portion by a line drawn from Cape Mele, some twenty miles west of Vado, to Cape Corso at the northern extremity of Corsica. The two Yellow Fleets were thus compelled to operate entirely within the Tyrrhenian sea which narrows in the latitude of Elba to a channel barely thirty miles wide between that island and Corsica. There is also a much narrower channel between Elba and the Italian mainland, but this is beset for some distance to the southward by the islands of the Tuscan Archipelago which are well furnished with signal-stations, so that a fleet endeavouring to pass in either direction by this narrower channel would almost inevitably be observed from the signal-stations, and, being inferior in speed to its adversary, would almost certainly be overtaken and defeated by the latter before it could effect a junction with an allied force coming from the opposite direction. Hence for practical purposes the only passage open to the Yellow Fleets would seem to be the channel between Elba and Corsica. To have attempted the narrower channel between Elba and the mainland would have been to court defeat. Such an enterprise might succeed, but it could only succeed by accident, and by a total failure of all the measures which the Green Commander might be expected to take for the purpose of frustrating it. It is true that reliance upon the intelligence derived from signal-stations is not always justified by the event, and that it nearly always involves considerable delay; that torpedo attack upon a moving, well-armed, and vigilant squadron is a mode of offence which has often been known to fail; and that in our present knowledge of the

art the best laid schemes of scouting are singularly liable to miscarry. Having regard to considerations such as these, it is possible that in actual war, and for an adequate object, a resolute commander might attempt such an enterprise, and might even succeed in it. But this would be because he would not be hampered, as he must be in manœuvres, by artificial conventions and restrictions, and might even think it expedient to incur the almost certain risk of defeat for the sake of rendering the residual strength of his victorious adversary inferior to that of his still undefeated ally. But no considerations such as these apply to the case of manœuvres. In manœuvres defeat according to the rules means failure, and no allowance is made for the effect even of victory in reducing the fighting strength of the victorious force. Besides, in manœuvres the consideration of what is possible and what is not is governed rather by the general principles and probabilities of warfare than by the motives which might actuate a resolute commander if he felt that he could best serve his country by suffering defeat. For reasons such as these the alternative course of attempting to pass the narrower channel between Elba and the mainland may be dismissed as impracticable in the circumstances, and the issue is thus narrowed to the possibility of either or both of the Yellow Fleets being able to pass between Elba and Corsica without being intercepted by the superior Green Fleet.

The situation further considered.

It is evident that neither Yellow Fleet could reach the channel in question in advance of the Green Fleet. Hostilities began at 10 A.M. on the 26th of August. Maddalena is about 100 miles from the line drawn from Bastia in Corsica to the nearest point of Elba, and this line could, therefore, be reached by the Green Fleet steaming at 10 knots about nightfall on the same day. The Yellow Fleets, on the other hand, could only steam 8 knots, and, therefore, the southern Yellow Fleet starting from Cagliari would at nightfall on the 26th still be far away to the southward. The northern Yellow Fleet, on the other hand, starting from Vado, would at the same time be somewhere on or within a circle with its centre at Vado and its circumference passing about five miles from Cape Corso and about half that distance from the island of Gorgona. Hence it was certain that the only line of communication which the Yellow Commander would be likely to regard as practicable would be occupied in force before either of the Yellow Fleets could reach it. It was natural, therefore, for the Yellow Commander to temporise. He seems to have resolved, rightly or wrongly, not to attempt to pass to the south of Elba until his adversary's dispositions were developed, hoping apparently that they might be found to afford him some opportunity of evasion. In this he was disappointed. Whether no such opportunity offered, or

whether, if it did, he failed to seize it, the narrative of "Jack La Bolina" affords no sufficient grounds for determining. But though the Yellow Commander was possibly well advised in not attempting the passage during the first night of the operations, the general remark may be hazarded that a timid and hesitating policy is fatal to a fleet which essays to act on the offensive. Such a fleet must, with due regard to occasion and opportunity, dare its utmost, and if the risks which confront it are greater than it cares to face, it must renounce even the pretence of acting on the offensive. The southern Yellow Fleet seems to have been ordered not even to attempt to force its way past the Green Fleet, but to remain well to the south of Elba, at a rendezvous where it would be joined by its northern ally should the latter succeed in evading its adversary. But the northern Yellow Fleet never succeeded in passing to the south of Elba, and it does not seem to have made any serious attempt to do so. After some delay it was discovered by the Green Fleet in the northern portion of the manœuvre field, and chased back into Vado Bay. There it was blockaded by its adversary for the few hours which elapsed before the first period of the operations was declared to be at an end.

A possible solution of the problem suggested.

The strategic problem involved was a very simple one, as "Jack La Bolina" points out, but it was not perhaps quite so simple as he represents. It imposed two different but reciprocal tasks on the opposing forces: that of evasion on the Yellow Fleets, and that of discovery on the Green. The task of evasion is always a difficult one and is very rarely accomplished with success. A fleet which by means of evasion can count on effecting a junction with an allied force sufficiently strong to give the combined fleet a superiority over its adversary will be justified in running great risks for the purpose of securing so decisive an advantage. But the conditions imposed on the combatants during the manœuvres under consideration may well have been such as practically to disallow a strategy which, in actual warfare, would probably suggest itself to an enterprising commander. The southern Yellow Fleet starting from Cagliari could, while giving a wide berth to the hostile signal-stations on the east coast of Sardinia, have reached the channel between Elba and Corsica during the second, or any succeeding night of the operations. Its ally starting from Vado and equally eluding observation from the shore might have reached the same point at the same time; and if both fleets had steamed after nightfall, with lights extinguished, as close to the neutral territory of Corsica as the regulations allowed, a hostile fleet in the offing would have experienced great difficulty in detecting them. If they found the channel unguarded they could have effected their junction there and then. If one fleet were de-

tected it could still fight its way onward in the hope of shortly receiving effective support from its ally, and if both were detected simultaneously, the hostile fleet on the look-out would forthwith be placed between two fires.

Comparison with British manœuvres in 1894.

A very similar but rather more complex problem was involved in the British manœuvres of 1894. Admiral Seymour in occupation of the Irish Channel was required to prevent the junction of two hostile fleets coming one from the north and the other from the south. Here the alternative was presented of occupying either the northern or the southern entrance to the Irish Channel. The alternative of the southern entrance, which is about 40 miles wide, was rejected by Admiral Seymour because he felt that he could not effectually watch it and at the same time meet the contingency of his southern adversary dividing his squadron into two portions and sending forward a detached squadron in advance of the main body, and on a different course, so as to draw off Admiral Seymour in pursuit, and thereby compel him to leave some portion of the channel open to the passage of the main body. A similar disposition would seem to have been open to the Yellow Commander, if taking advantage of the division of the channel by the islands of the Tuscan Archipelago he had endeavoured to draw off the Green Fleet from the wider passage between Elba and Corsica by sending an advanced detachment through the narrower passage between Elba and the mainland. But undoubtedly his inferior speed must have rendered such a proceeding peculiarly hazardous. On the other hand, the alternative chosen by Admiral Seymour of occupying the northern entrance to the Irish Channel presents a much closer analogy to the disposition suggested above as possibly open to the Yellow Commander; and the fact that, as was pointed out in the *Naval Annual* for 1895, Admiral Seymour did not consider the disposition adopted by him as by any means certain of success even in a channel less than half as wide as that between Elba and Corsica, would seem to show that the disposition suggested as possibly open to the Yellow Commander was not absolutely a desperate one. But the relative speed of the opposing fleets engaged in the Italian manœuvres materially affects the force of the analogy suggested, and the fact that the Yellow Commander recoiled from any attempt of the kind may perhaps be accepted as a proof that the obstacles interposed by the rules, by the geographical situation, and by other conditions involved, were deemed by him to be insurmountable.

The second period of the manœuvres.

The operations of the second period of the manœuvres were based on the assumption that the Yellow side had accomplished the task assigned to it during the first period, and, having established its superiority over the Green side, was free to act on the offensive

against the fleet and coasts of its adversary. The superiority of speed was now by the regulations transferred together with the superiority of force to the Yellow side, which was henceforth allowed to steam at ten knots during the daytime against its adversary's eight. By a somewhat arbitrary arrangement, however, these conditions were reversed during the night. In the situation thus established most English critics will probably agree that the primary object of the Yellow side should have been to discover and pursue the Green Fleet so as to bring it to a decisive action, or having chased it into one of its own ports there to blockade it, detaching so much of its force as could be spared for the purpose of hunting down detached cruisers of the enemy and of carrying on such other offensive operations as might commend themselves to the Yellow Commander. But the problem of naval warfare does not seem to be so regarded by the majority of Continental authorities. We have seen that in the French manœuvres coast-attack was treated as an end in itself and assigned as a primary function to the fleets acting on the offensive during the operations. There was no recognition of the great principle, so steadfastly pursued and so splendidly illustrated by Nelson, that naval warfare is essentially a conflict of sea-going fleets at sea and that a naval commander who is in a position to take the offensive should allow nothing to interfere with his pursuit and observation of the enemy's sea-going force. If he can destroy it the command of the sea is his. If he can blockade, contain, or mask it, he can undertake such offensive operations as are within the compass of the forces at his disposal, with the certainty that the enemy cannot interfere with them without fighting an action against superior force. But the Yellow Commander seems to have ignored this principle altogether and to have totally disregarded the sound doctrine that a hostile naval force still strategically at large must always be the immediate objective of a fleet which aims at establishing its own command of the sea. Leaving the inferior Green Fleet to watch his proceedings from a respectful distance and to impede them if it could, he proceeded to employ his cruisers in the destruction of the enemy's signal-stations, the blowing up of his accessible railway bridges and tunnels and the cutting of submarine telegraph cables, and his whole fleet in the bombardment of undefended towns on the coast.

Criticism of the strategy involved.

None of these operations can be regarded as belonging to the higher functions of a victorious and superior fleet. As was pointed out in the *Naval Annual* for 1894, "it is difficult to determine the precise strategic value of demonstrations from the sea against railways, telegraphs, signal-stations and the like; but it is safe to

say that the conditions in which they can attain to decisive importance must be more or less exceptional." The destruction of signal-stations is little better than a triviality. It can do little harm to an enemy who is not strong enough to take the sea, and so long as he is strong enough to take the sea the superior fleet will have other and far more important work to do. To employ modern warships in the destruction of railway bridges and tunnels is like using a steam-hammer to crack a nut. The thing can be done of course; but the relation of means to ends is ludicrously out of proportion. The bombardment of undefended towns is an act of unmitigated barbarism, certain to provoke manifold reprisals if its perpetrator is not in command of the sea, and utterly indefensible if he is, since in that case he is able to damage his adversary by a variety of methods at once more effective for their purpose and more in accord with humanity. It seems obvious, though the fact appears to be often overlooked, that, a warship being essentially a floating engine, its efficiency is absolutely limited by the range of its guns at the point where its keel comes in contact with the bottom of the sea. Beyond that point it can only operate in a landward direction by methods, appliances, and forces which, although they may temporarily have their origin in the ship itself, are essentially military and not naval in character. Experience shows in fact that military enterprise properly begins at the point where naval enterprise must end, and that the resources of a ship for military, as distinct from naval, enterprises are of necessity limited to the very slender force which is capable of being detached from the ship without impairing its efficiency. It follows that as soon as a naval force has secured the command of the sea it will best use the power it has acquired, not by frittering away its native energies in trivial enterprises on land, for which they are singularly ill-fitted, but by covering the transit of military forces properly equipped for the enterprise they are required to undertake. Until it has established its power to do this it has no command of the sea, and, lacking the command of the sea, it will accomplish little and risk much by ineffectual enterprises on its own account against the shore. It is quite a mistake to suppose that modern warships are better fitted for territorial enterprise than their predecessors of the sailing-ship period. They are much more highly organized machines; their efficiency depends on a much more minute division of labour, and on a much more highly specialized differentiation of individual function; and, with all this, their crews are much less numerous in proportion to their tonnage. Even in the sailing days the relation of maritime attack to defence on shore was expressed, somewhat hyperbolically perhaps, in the French saying, "un canon à terre vaut

un vaisseau à la mer"; and there is no reason to think that the true proportion, whatever it may have been, has in any sense changed to the advantage of the ship since the introduction of steel ships and rifled guns. Coast attack is, in fact, the final and crowning enterprise of naval warfare, the point at which the sea and its power having done their work hand over the further prosecution of hostilities to the military arm. To invert the order is either to court disaster if the command of the sea has not been secured, or, if it has, to confuse the inherent functions of military and naval enterprise.

The conclusions drawn from the manœuvres by Rear-Admiral de Amezaga, being mainly administrative in character, hardly seem to invite comment in a paper which deals exclusively with the strategic aspect of the operations described. But the final comment of "Jack La Bolina" raises a strategic issue of no little interest. "In these and previous naval manœuvres," he says, "the side engaged in defence has always succumbed to its adversary." This is, of course, the necessary effect in manœuvres of conditions established beforehand. If the attacking force is given by the rules a superiority over its adversary, it is scarcely reasonable to blame the latter for failing to act as it might have done if the conditions had been reversed. Nor is there much more substance in the criticism that in order to defend the Tyrrhenian coasts of Italy the Sicilian and Adriatic coasts were left entirely undefended. The presumption evidently was that the only attack to be apprehended would come from the westward. If a simultaneous attack was apprehended from the eastward, the Adriatic coast, would, of course, have to be defended as well, assuming, for the sake of argument, that naval warfare is really and essentially an affair of coast defence, an assumption which, except for the sake of argument, the present writer, at any rate, would be very reluctant to make. But when two-thirds of the available naval forces belonging to Italy were told off for the purpose of a pretended attack directed exclusively against the Tyrrhenian sea-board, no conclusive judgment can be formed in regard to the capacity or incapacity of the whole of the Italian fleet to protect the whole of the Italian territory. The truth is that the sufficiency of a national fleet to protect the national interests entrusted to its charge is determined much more by the naval strength of its probable enemies than by the extent of coast it has to guard. In 1870 the sea frontier of Germany was comparatively insignificant in extent. But, such as it was, it was adequately defended against purely maritime assault in spite of the overwhelming preponderance of France at sea. On the other hand, the maritime supremacy of France was powerless to protect her territory from invasion, her capital from occupation, and her dynasty from collapse.

Jack La Bolina's comments considered.

But if Germany had needed to invade France at sea, or to resist a French attack delivered across the sea, the possession of a fleet superior to that of France would have been indispensable to the success of her own aggressive enterprise and to the defeat of that of her enemy, and this independently of the proportionate amount of coast belonging to the two Powers. These analogies apply more or less directly to the case of Italy. If the conflict of Italy with her possible enemies is to be decided at sea, nothing but naval superiority can save her from serious disaster. If, on the other hand, it is to be decided on land, defeat at sea would undoubtedly accentuate the catastrophe of her defeat on land, but so far as it did so it would be by laying her shores open to invasion across the sea rather than by exposing them to purely maritime forms of attack. The utmost that even a dominant fleet can do, without military support, against the shores of its enemy, is summed up in the enterprises undertaken by the Yellow Fleet in conditions assumed, not perhaps quite legitimately, to establish its decisive superiority over its adversary. The sum of all these enterprises and their results is really insignificant compared with the power which such a fleet possesses of covering a military descent in force. If Italy were inaccessible to invasion except across the sea, the maintenance of her naval supremacy against all probable combinations of assailants would be for her, as it is for England, a vital condition of her security and tranquillity. But as she is also accessible to invasion by land, the proper proportion to be maintained between her naval and military defences becomes a question of national policy which it would be impertinent for a foreign critic even to attempt to discuss. Accordingly no opinion can be expressed in this place on the propriety of "Jack La Bolina's" conclusion that the naval defences of Italy ought to be still further strengthened at the expense of her military establishments.

JAMES R. THURSFIELD.

CHAPTER X.

Marine Engineering.

In the last issue of the *Naval Annual* the chapter devoted to the engineering aspect of the warship was largely occupied by a discussion upon circulation of steam and water in water-tube boilers. We explained the difference between drowned and above-water tubes, and endeavoured to make clear the principles involved in the application of each type respectively. During the past year an additional number of small swift vessels have been completed having express boilers of various types, each of which has given excellent results. The trials of these vessels have been so uniformly successful that there is little that is new to say about express boilers, and we may turn our attention chiefly to the larger tube variety.

The Belleville boiler.

The trials of the two big cruisers Powerful and Terrible during the past year have fully established the success of the boilers placed in them, so much so that the Belleville type may be said, for the present, to have definitely taken the place of the return tube boiler for the purposes of the fleet. The illustrations on page 190 give two views of the marine type of Belleville boiler. Fig. 1 is a front elevation with part of the casing removed, thus showing the front headers or junction boxes which make connection between the different lengths of tubes. Fig. 2 is a side elevation of the same boiler. The casing is removed so as to expose the grate, the fire-brick furnace, and the steam-generating tubes with their junction boxes. The top drum, or steam receiver, is shown in cross section on one side. The flames and hot gases ascend amongst and around the steam-generating tubes, passing off by way of the up-take to the chimneys. A boiler will contain a given number of elements or tube sections, each element consisting of a vertical zig-zag water and steam way, made up of a number of lengths of tube connected at their ends by the junction boxes. It is these lengths of tube that constitute the heating surface. In the boiler illustrated there are eight elements, as shown in Fig. 1, and eighteen tubes in each element, as shown in Fig. 2. Each element forms a water-way—or rather water and steam way—between what is known as the feed

water collecting tube C, at the bottom, and the steam drum D at the top; so there are in the boiler in question eight communications by which water may pass upwards from C to D. The feed water collecting tube is square in section, and runs horizontally from side to side of the boiler just above the furnace doors. The bottom end of each element leads from this collecting tube.

We will now, for the sake of simplicity, deal only with a single element—that is to say, the tubes shown in Fig. 2, and those which are included in the right-hand, vertical, double row in Fig. 1. Starting at the front end of the bottom tube, we find it screwed into the hollow header, or junction box, the latter being in communication

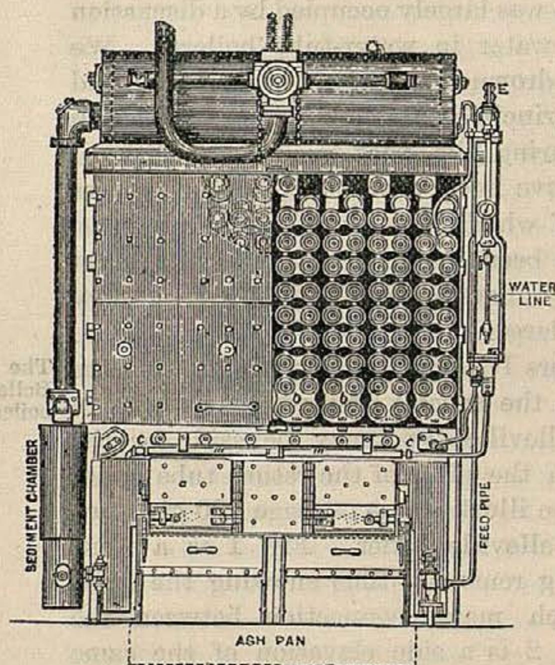


Fig. 1.

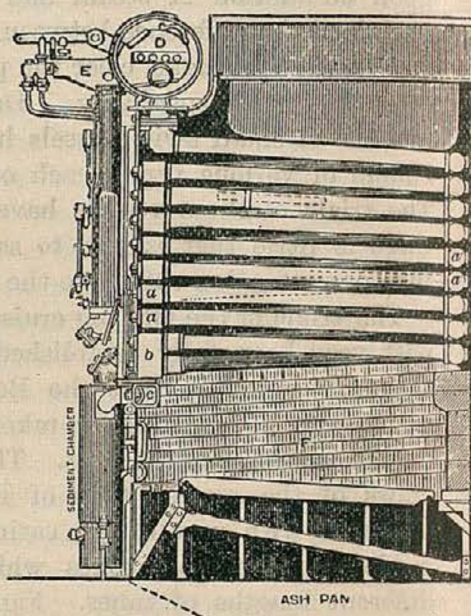


Fig. 2.

with the feed collector by means of a short vertical nipple. The first length of tube—it is not very clearly shown in Fig. 2, being in shadow—inclines slightly upward towards the back of the furnace, and leads into another junction into which the next length of tube is also screwed. This also inclines upwards, and, doubling back, terminates in the front junction box, from which the next length of tube in turn starts, as shown. In this way the lengths of tube double back on each other until the element is formed, the junction boxes making communication between them. The circulation of water and steam—the need for which was dwelt upon in the last issue of this *Annual*—is provided by means of two downcomer pipes communi-

cating between the steam drum and the feed collecting pipe. One of these downcomers is very plainly shown at the left of Fig. 1.

Circulation in Belleville boiler.

We have now the complete circular water-way necessary for the proper working of the boiler. The feed water is pumped into the upper drum (not first into the feed-collecting pipe, for reasons which will be explained later), or steam chest. Thence it flows down the downcomer pipes and passes into the square horizontal feed-collecting pipe, by way of which it passes into the generating tubes of the elements, and ascends up the latter to the steam drum again, being partially converted into steam during its course. The Belleville boiler has an energy of circulation due to the head caused by the difference in specific gravity of the contents of two imaginary tubes having a vertical extension equal to the vertical distance between the steam drum and the feed-collecting tube. The difference in specific gravity between the two contents of these two imaginary tubes would arise from one tube (represented by the downcomers) being filled with water, whilst the other (the generating elements) contains a mixture of water and steam. So far it will be seen that the Belleville boiler is in general principle similar to the express boilers of the Thornycroft or Yarrow, which we dealt with so fully last year. We have in both cases the steam-generating tubes leading through the furnace gases to the steam drum above, and then the downcomers* connecting the steam drum to a receptacle below, from which the water passes again to the generating tubes. When, however, we come to detail we meet with an enormous difference between the two systems. In the Yarrow boiler—which we select for comparison because the difference between it and the Belleville is more strongly marked—there are several hundreds of straight direct communications between the steam drum and the wing cylinders (which are the equivalents to the feed-collecting tube), so that there is little to obstruct the flow of water. In the Belleville system, with approximately the same head available, there are about eight communications, and the water has, therefore, to flow backwards and forwards above the fire, having its progress checked every time its direction is reversed. In a Yarrow boiler any particle of water entering the generating part of the boiler will have a straight course of a few feet, either as water or steam, before getting to the steam drum. In the Belleville boiler it will have to travel through a distance perhaps twenty times as great, and have to reverse its direction absolutely twenty times during its course. On the other hand, the Belleville tubes would be 4½ in. in diameter, whilst in the

* The Yarrow boiler need not have separate downcomers, but the fact does not affect the illustration, as the back generating tubes act as downcomers.

Yarrow boiler they would be, say, $1\frac{1}{8}$ in. in diameter. The resistance to circulation is diminished in the former by the tubes being of greater sectional area, and in the latter by the shorter distance the water has to travel, and by its more direct flow.

It will be gathered from what has been said that special attention has to be paid to the question of circulation in the Belleville boiler. In order to prevent a reversal of the proper direction of the course of water and steam, non-return valves are placed at the ends of the downcomers, and the orifices connecting the feed-collecting tube and the steam-generating elements are restricted in area, with a view, it is said, to maintain the circulation in the right direction, although how this is effected appears somewhat vague. As previously stated, the feed-water is delivered into the steam-drum, the inlet orifice being placed as far as possible from the downcomer pipes. The latter at their lower ends discharge into cylindrical sediment chambers clearly shown in the engravings. After the comparatively cold feed is introduced into the steam-drum the increase in its temperature causes the lime salt which may be contained in the water, and which forms the most objectionable ingredient of "boiler scale," to be precipitated. It is a feature of the Belleville system to add lime-water to the feed, with a view to get more complete precipitation, and also that the lime may combine with any grease brought over from the engines with the condensed steam, the lime and grease thus forming a species of soap. The precipitated salts and earthy soap collect in the sediment chamber which can be cleared at intervals, the danger of scaling the tubes being, it is claimed, thus removed.

Belleville boiler not adapted for forcing.

From the foregoing facts it will be seen that the Belleville boiler does not lend itself readily to forcing the rate of evaporation. The lower lengths of tube immediately over the fire are naturally subjected to the greatest heat. It is conceivable that some steam may be formed in the first or lowest tube of the element, supposing the fires to be strongly urged by forced draught, and water in the lengths of tube above would be driven forward into the steam-drum, from whence it would descend by the downcomers to again enter the steam-generating element, the general principle being the same as in the Thornycroft or Yarrow boiler. There is a difference in effect, however, which is due to the long tortuous passage of the Belleville element, as already explained. The steam and water, in place of being almost immediately discharged into the top drum, have probably 150 feet to travel, and have to turn twenty corners. All this time they are being subjected to the flame and furnace gases. If all the water be evaporated in the lower lengths of tubes, the steam will be superheated, and the top tubes will possibly be burnt. With the

contracted orifice for the admission of feed-water, and the long zig-zag steam-generating element, the Belleville boiler approaches more nearly than does the express boiler to the conditions of a water-tube boiler without circulation—the simple close-bottomed tube of our illustration of last year. In other words, with the fierce fire of forced draught there is danger that the vigour of circulation would not be sufficient to force water through the restricted entrance to the elements with a rapidity adequate to supply the demand for evaporative purposes. The presence of the non-return valves in the downcomers confirms this view, which is further supported by the fact that the Belleville boiler is not worked at rates of fuel combustion that are considered admissible with other boilers. It should also be remembered that it is part of the Belleville system to reduce the steam-pressure between the boilers and the engines. This "throttling" of the steam is a method employed with ordinary boilers to keep the water back when there is a tendency to prime. It was by throttling, by means of a permanent obstruction in the steam-pipe, that the late Mr. Perkins managed to keep the water from priming out of his boiler; and the Belleville boiler may be said to occupy a position between the modern express boiler and the Perkins boiler. Indeed, it was the second step in the evolution of the series, for the Perkins boiler was as long before the Belleville as the Belleville was before the present express boiler. These remarks apply only to the Belleville boiler if forced. When operated at easy rates of steaming it works admirably.

Combustion in Belleville boiler.

Pneumatic stirrer.

An examination of the illustrations of the Belleville boiler will show that there is not much space between the fire and the bottom tubes of the elements. In order to ensure a sufficient approach to perfect combustion in a boiler furnace it is needful that the gases liberated from the fuel should be brought in contact with the oxygen in the air before these gases have been cooled below the temperature necessary for combustion. In the return-tube boiler the back end combustion-chamber fulfils this purpose, whilst in the Thornycroft and Yarrow boilers the ample combustion-chamber is placed in the most advantageous position, namely, right over the fire. It will be evident that if an atom of carbon gas, set free from the coal on the grate, come in contact with the comparatively cold heating surface of the boiler (which, though heating-surface for the water inside is cooling-surface to the furnace gases), it will be brought below the temperature of combustion and condensed into carbon, instead of combining with its complement of oxygen; in other words, the gas will be turned into soot in place of being burnt and giving up heat in the process. As the boiler-tubes in the Belleville boiler are so

near the fire a large number of atoms of carbon, besides other unconsumed gases, would be likely to be condensed and escape unburnt were not special precautions taken, and the result would be a large volume of black smoke and a corresponding waste of coal. In order to get over this difficulty there has been introduced in the Belleville system a device which may be described as a pneumatic poker or stirrer. It consists of a pipe running along the front of the boiler above the fire-doors, through which pipe air compressed to 10 or 12 lbs. to the square inch—for moderate rates of steaming—is injected inwards by means of a number of small nozzles, the jets being directed across the top of the furnace and rather downwards on to the fire. By means of these powerful air-jets the fuel-gases are eddied about and mixed up with the oxygen, so that combustion is effected before the cooling effect of the tube-surface is brought into play.

Trials of Powerful and Terrible.

The engines of the Powerful and the Terrible were designed to develop no less than 25,000 I.H.P., the greatest power ever put into any vessel of the type. The engines of both ships are practically alike, and do not possess any especial features that call for detailed description here. They are of the now almost universal inverted, direct-acting, three-stage compound, condensing type. The high-pressure cylinder is 45 in. in diameter, the intermediate 70 in., and the two low-pressure cylinders each 76 in. in diameter; the stroke of all is 4 ft. It may be added that there are altogether eighty-seven engines of various types on board. Steam is supplied to these engines by forty-eight Belleville boilers. The proportions differ slightly in the two ships, though not sufficiently to be of importance. In the Powerful's boilers there are 67,800 square feet of heating surface and 2200 ft. of grate area. The boiler-pressure is 260 lb., but it is brought down by special reducing valves, so that the initial pressure in the first cylinder does not rise above 210 lb. to the square inch.

A good deal of difficulty was experienced in bringing off the trials of both ships, partly on account of the weather and partly from other causes. On 25th September, 1896, an eight hours' consumption trial of the Powerful was made, when the patent log indicated 13·4 knots. The total I.H.P. was 4953, or about one-fifth of the estimated maximum power, and the coal consumption was 2·2 lb. per I.H.P. per hour. The coal on this, as on the other trials mentioned was Nixon's Navigation, hand-picked, so that there was nothing to be desired in the quality of the fuel. Three days later a thirty hours' coal consumption trial was made. The total I.H.P. was 5008 and the mean coal consumption was 2·09 lb. per I.H.P. per hour. The rate of consumption was 14·2 lb. per sq. ft. of grate

per hour. Only sixteen boilers were in use. The results, which are certainly moderate, would have been better from an economical point of view had all the boilers been in use, as then the engines would have been working nearer their point of maximum economy.

The next important trial was made on 13th and 14th October, when the ship was under way for thirty hours, a mean horse-power of 18,433 being exerted by the machinery. The coal consumption was here 1·838 lb. per I.H.P. per hour. All the forty-eight boilers were in use. The coal burnt was 16·1 lb. per sq. ft. of grate per hour. The full power trial of the Powerful was made on 28th November. In addition to the usual four hours' run with engines working at maximum power, a further run of four hours immediately followed, the power being kept up to not far from the maximum. The mean power during the first four hours was 25,886 I.H.P., and for the second four hours 22,634 I.H.P. The speed for the four hours' run was 21·8 knots, but the weather was against fast steaming, and on another occasion it is stated that 22 knots was reached with less power exerted by the engines. As a rule, there is a great deal of uncertainty about the rate of steaming of large war vessels, and it is generally wise to accept stated speeds with caution. The patent log is untrustworthy, and runs over "known distances" must be observed with the greatest skill and impartiality in order to afford true records. In the case of the trials of these ships, however, special efforts were made in the latter direction. The Terrible, on a consumption trial made in January of this year, reached an economy of 1·71 lb. of coal per I.H.P. per hour. On the full power run of this ship the speed was recorded as 22·41 knots, the I.H.P. being 25,572.

Coal consumption.

In regard to coal consumption it will be seen that the machinery of these ships produces the power required at moderate speeds with an economy of fuel which is good, but not unprecedented for vessels of war. Boiler economy is, however, a point upon which we can speak but vaguely in dealing with war vessels owing to lack of observed data. It is doubtless unnecessary to dwell here on the fallacy of calculating boiler efficiency in terms of horse-power developed; for the horse-power takes account of performance of the engines more especially. For instance, if the Powerful had had leaky valves or pistons the consumption of coal per I.H.P. might have been very high, though the boilers were generating steam in a most economical manner. There is, however, a far more serious disturbance to calculations, that due to steam required for auxiliaries. Indicator diagrams are taken from the cylinders of the main engines only, and from these diagrams the power is calculated, no account

being taken of the large number of auxiliary engines all of which take steam from the main boilers.

It is chiefly for this reason that it is so difficult to make a comparison between Naval and Mercantile practice in the matter of fuel economy. We must not compare the 1·7 lb. per I.H.P. of the Terrible with the 1 lb. Mr. Mudd obtained with the cargo boat Inchmona. As we have intimated, the Belleville boiler did fairly well in regard to economy at moderate rates of steaming, though possibly the result was not quite so good as might have been obtained with ordinary boilers supposing equal care to have been taken in both cases. Probably never before was a trial of a big ship so admirably organised as were the trials of the two big cruisers. No effort was spared, nothing was left undone that could contribute to efficiency. The trials were a splendid *tour de force*, and the results obtained reflect the highest credit on the foresight, skill, and energy of the engineering departments of the Admiralty and of the dockyard.

It is not, however, when running at moderate rates of evaporation that the Belleville boiler is generally reported to be deficient in economy; it is when pressed to higher duty that it is said to fall off unduly. How far this may be true we have no means of positively ascertaining, for the amount of coal burnt is not recorded on full speed Admiralty trials. The matter is not, however, one of the highest importance in war ships as the greater part of their steaming is at moderate speeds, and a little extravagance in coal may be tolerated in the presence of an enemy.

Economisers, advantages of.

Efforts are being made by the Admiralty authorities to get with the Belleville boiler a still higher duty from the coal, and for this purpose economisers are to be fitted into the new ships of the Canopus class; in virtue of which fact 1000 horse-power has been added to the original 12,500. The use of the economiser is attended with difficulties, and the device is looked on with disfavour by many engineers who consider it as only an extension of heating surface which had better, for many reasons, be put into the boiler itself. There is truth in this, but with the Belleville boiler it is not the whole truth. It is a sound axiom of steam generation that the furnace gases, when hottest as they come from the fire, should be first brought in contact with the hottest water, whilst the coldest gases should heat the coldest water. In a shell boiler this principle cannot be carried out as the temperature of the water is approximately the same; excepting, perhaps, at the bottom under the furnaces, when getting up steam. The advantage of the method of working above referred to will be seen when it is remembered that the rate of heat transmission from one body to another is dependent on the difference in tempera-

ture between the two bodies. Thus, supposing the furnace gases to be at, say, 700° Fahr. just before leaving the boiler, the water in which would be at 500° Fahr., the gases would have to be kept a long time in contact with the heating surface before they would part with any further appreciable amount of heat; and even in an ideal case it would be impossible to reduce the temperature of the gases below the 500° of the water and steam. In this respect the Belleville system, in common with many others, is imperfect, for the coldest water, that entering the bottom of the elements, is subjected to the greatest heat, and when the water and steam have taken up all the heat they can obtain they are in contact with the coldest gases. One can easily understand the elements being carried up far enough so that the top turns would be almost condensers, supposing radiation from the boiler casing to be considerable. In actual practice the efficiency of heating surface must fall off enormously towards the upper rows of tubes. The Belleville boiler has a very large area of heating surface compared to shell boilers. Possibly this virtue has been carried to an excess.

Difficulties in using economisers.

If an economiser be added to the Belleville boiler what would be the waste heat of the chimney will heat the feed, so that the coldest gases will be brought in contact with the coldest water, that is if the design be properly worked out, as is not always the case with economisers. In any case this compounding of the boiler must lead to fuel economy if it can be worked practically. Economisers are, we need hardly say, no new thing. They have been tried in different forms over and over again, and for years their record was failure. The best known now is Green's, which is found to answer well on land. It consists of a series of pipes, through which the feed water flows, and which are placed in the course of the furnace gases as they pass towards the chimney. The chief difficulty in using an economiser is that the dust and tarry particles in the products of combustion accumulate upon the outside of the cold pipes, and in this way the effectiveness of the surface for heating purposes is destroyed by a coat of non-conducting material. If dependence could be placed on always using good Welsh coal the difficulty would be decreased, but in time of war this might not always be possible. In Green's economiser there are a series of scrapers which embrace the pipes and are made to travel up and down by mechanical means, and in this way the heating surface is kept clean. Another way of preventing the objectionable deposit is by securing perfect combustion in the furnace. This, however, is a thing that has never yet been attained at sea, and only in exceptional cases on land. The one satisfactory economiser the writer has ever seen working without

scrapers is that fitted to the refuse furnaces at Oldham in Lancashire. In the burning of refuse it is absolutely necessary to have perfect combustion if nuisance is to be avoided. In these furnaces, therefore, every precaution is taken to burn all fumes given off by the often putrid refuse before they reach the chimney and are distributed over the town. The end is obtained most completely by devices which could not be followed at sea, involving as they do, a large mass of firebrick. If in the Belleville boiler the combustion of the furnace gases can be made so complete, by means of the pneumatic stirrer previously described, as to burn up all tarry particles, the economisers may be successful without scrapers.

Boiler room weights.

The advocates of the Belleville system have, however, never laid much stress on fuel economy as one of the prominent virtues of the system; it is lightness they have advanced as its chief claim to preference. The estimated boiler-room weights of the Powerful were 1184 tons, but it is said that 20 tons of this were saved during construction. Probably we may accept the latter figure as correct, for the Admiralty very wisely made every concession possible to enable the contractors to save weight. It is a fact that should be taken into consideration, as the shell-boiler maker never received such an advantage in the old days. With the full power-working of 25,886 horse-power of the Powerful, the ratio of weight in tons to units of power would be 1 to 22·24, which is an excellent result. It is not as good as the 28·3 I.H.P. per ton weight of ordinary boilers obtained on the Blenheim's trial, the 24·3 I.H.P. per ton of boilers of the Vulcan, the 25·5 of the Trafalgar, the 22·5 of the Nile, nor the 22·3 of the Royal Sovereign. If we turn to smaller craft we find that in the second-class cruisers of the Naval Defence Act seven exceeded the Powerful in lightness of boiler. All these figures refer to ordinary return-tube boilers, and in some cases, notably that of the Vulcan, the power was obtained by forcing the boilers in a way they never ought to have been forced, unless in the presence of an enemy. In the third-class cruisers of the Medusa class the boiler weights were below those of the Powerful, as they worked out 25·3 I.H.P. per ton. In these vessels, however, the cutting down of boiler-weight was so disastrous that the comparison is not a fair one. It is claimed by the supporters of the Belleville boiler that the comparison of weight and power between the two boiler systems should be based on the natural draught trials of ships having the ordinary shell boiler. It does not appear that this claim is well grounded. If the Belleville boiler will not, and the shell boiler will, stand forcing, that is a point which should be scored in favour of the shell boiler. To some extent, however, the Belleville boiler is worked

Return-tube boilers.

on a forced draught system, for there are the pneumatic pokers, before referred to, which must send a considerable volume of air through the furnace. Moreover, on the Powerful and Terrible trial the stokehold fans were running all the time, and, though there are no air-locks in the two big cruisers, we hear of temporary canvas screens fitted up at stokehold openings. Further than this, a length of 10 ft. was added to the chimneys after the preliminary runs.

Advantages of forced draught.

The absence of forced draught in any boiler system is a distinct disadvantage for a war vessel. Nothing is more vulnerable in a warship than the funnel, and it is hardly possible to conceive a close action in which the chimneys and inlet cowls would not be speedily rendered useless. With natural draught only this would make the stokeholds untenable, but with forced draught a little extra speed of the fans would put matters comparatively right so far as below decks might be concerned. In any case fans must be fitted in stokeholds, if only for ventilation purposes. We have said that in the case of the Vulcan, and still more in the notorious "M" cruisers, the boilers were driven beyond reasonable limits. Even with the Royal Sovereign the trial had to be stopped before the full time had been run because of "leaky tubes," an ominous expression we happily no longer hear, excepting in reference to past tribulations. It should be remembered, however, that forced draught must be regarded as a measure in reserve. The Blenheim's boilers may have wanted several days' work spent upon them after the trial. Still, the remarkable result was obtained of over 28 I.H.P. per ton of boiler, and the ship even then was not disabled. What the extra speed obtained would have been worth in action it is for the Naval tactician to say, but we know that all authorities attach a high value to speed for tactical purposes, as well as for strategical considerations. It might be that the extra speed obtained by forced draught would enable the Blenheim to out-manœuvre an adversary of otherwise superior force, or to escape from another adversary of overwhelmingly greater power. If she could, by aid of forced draught, sink an enemy's Blenheim, or avoid being sunk herself by a more heavily armed foe, it would be a comparatively small matter to have to spend some hours later on in expanding tubes.

The Belleville boiler easily worked.

After all is said, however, the contrast between making a speed trial now with Belleville boilers and running a forced draught trial a few years ago is all in favour of the Belleville system. Whatever may be the comparative merits or demerits of the Belleville boiler, as compared to other types of water-tube boiler, it was to it that Mr. Durston very naturally turned when troubles and dangers in the boiler-room became apparent, for it was then the only water-tube

boiler with which extensive and favourable experience had been obtained in ocean-going ships of large size. It was to be expected that Mr. Durston and his colleagues should be attacked, as, indeed, they have been very vigorously attacked; but doubtless the professional officers—with the wise rule before them which prevents any reply to outside criticism—were able to work on quietly without much disturbance to their peace of mind; and the successful results of the Powerful and Terrible are a sufficient reward for the troubles they have gone through.

Advance in return-tube boilers.

Since, however, the designs of the Powerful and Terrible were got out, improvements have been made in the return-tube boiler. In the cruisers built at Elswick some remarkable results have been obtained in regard to boiler weights. In the case of the celebrated Argentine cruiser Buenos Aires, which reached a speed on her six hours' trial of over 23 knots, with natural draught, the ratio of weight to power on the design was somewhat better than 27 I.H.P. for each ton of boiler-room weights, and the six hours' trial was made without any defects being developed beyond a trifling accident to a lubricating tube. The boilers in this case were fitted with the screw-tube connection of Messrs. Humphrys, Tennant & Co., the contractors for the machinery. This tube connection—it was originally known as a "tube ferrule"—was first practically used on the trials of the Royal Sovereign, it being fitted in a certain number of tubes in some of her boilers. The trial of the Royal Sovereign had, as stated, to be stopped prematurely on account of leaking tubes, but none of the tubes fitted with the new device were found to be defective.

Space occupied.

Space occupied is from many points of view not less important than weight as an element of marine-boiler design. It is difficult to make any comparison in regard to this detail, because there are so many possible arrangements. In the Kherson, a ship of the Russian Volunteer Fleet, built and engined by Messrs. Hawthorne, Leslie & Co. on the Tyne, and having Belleville boilers supplied by Maudslay's, 20 ft. more of the length of the vessel had to be allotted to boiler space than was required for a vessel of the same fleet having return-tube boilers, and constructed by the same builders, the comparison being made on an equal basis of power developed. This probably does not give a fair idea of the merits, or rather demerits, of the Belleville boiler in this respect, as the stokeholds of the Kherson were very roomy and comfortable. On the basis of calculations made by the writer, he has formed the opinion that though the cylindrical boiler has some advantage in the matter of space occupied, the margin is not sufficient to be of great importance if the best be done that can be done in packing in the Belleville boiler.

Messrs. Maudslay, Son & Field, who are interested in the British patent for this boiler, have issued a book containing diagrams which show, in a number of cases of typical ships, the space occupied by the existing shell boilers, and also that which would be occupied by Belleville boilers were they substituted. The advantage, as might be expected, is on the side of the Belleville boiler. In this case, however, Messrs. Maudslay have worked a good deal on assumption.

There are, however, undoubted advantages which the Belleville boiler has—in common with most other descriptions of water-tube boilers—over the old return-tube type. In it steam can be raised with great rapidity without danger of injuring the boiler, there is no risk from overheating of furnaces through shortness of water, and repairs can be executed or boilers replaced without tearing up decks.

Large tube *v.* express boilers.

It may be that now the Admiralty engineering authorities have made so bold a step forward in discarding the cylindrical boiler and replacing it by a water-tube boiler with large tubes, they will make a still further advance and introduce boilers of the express or small tube type, such as we dealt with in the last issue of the *Naval Annual.* Under these circumstances it may be worth while to glance briefly at what would be the general gain. In the three last-named advantages—rapidity in raising steam, safety, and ease of total replacement—the express boilers have undoubted superiority, of which, however, it would be difficult to give an exact measure. In weight the gain due to using express boilers would be enormous. The Speedy is a torpedo gunboat of 4703 I.H.P., and is fitted with Thornycroft boilers of not the most recent type. On her many trials the boilers of this vessel worked with marked superiority over the shell boilers fitted in her numerous sister vessels. She is still in commission, after four years, and the boilers have given no trouble whatever from the first. On her forced draught trial 43·9 I.H.P. was developed per ton of boiler, very close upon twice the ratio obtained on the Terrible's trial. The Speedy was the first vessel to be fitted with these boilers, and no effort was made to get a high duty or save weight. The Swordfish and Spitfire, two destroyers built by Messrs. Armstrong and engined by Messrs. Belliss, were fitted with Yarrow boilers, the weight of machinery being at the rate of 46·63 lb. per I.H.P. The figure was divided as follows :—

Stern tube, shafting, and propellers . . .	2·35 lb. per I.H.P.
Weights in engine-room, including main engines, circulating engines, and other auxiliaries, condensers, and all pipes and fittings . . .	17·42 lb. per I.H.P.
Weight of boilers and water, funnels, casings, pipes and fittings in boiler-rooms . . .	26·86 lb. per I.H.P.
Total machinery weight . .	46·63 lb. per I.H.P.

Weights of express boilers.

Bringing this to the same standard we have previously used, we find the remarkable figure of 83·39 I.H.P. per ton of boiler.

The boilers of the Russian torpedo-boat destroyer, Sokol, built by Messrs. Yarrow & Co., burnt 2·1 lb. of coal per horse-power per hour, the consumption per foot of grate surface being 50 lb. of coal. The boilers were of the Yarrow express type. This economy was obtained when the vessel was on her official full-speed trial, on which occasion she made a higher speed than had up to then been reached. This figure compares very favourably with those quoted in connection with the trial of the two big cruisers. Since then better results have been obtained, the consumption having been brought down to 1·9 lb. on full speed trials. At lower rates of steaming the fuel economy would naturally be much higher.

Turning to the Thornycroft boiler, we find by reference to a copy of the report of the official trial of the destroyer Boxer that a total of 4543 I.H.P. was developed with an air pressure of 2·96 in. The revolutions were 410·3 and the boiler pressure 207 lb. per sq. in. The speed of the vessel was 29·17 knots. The following are the weights of the Boxer's machinery :—

Stern tubes, shafting and propellers . . .	2·53 lb. per I.H.P.
Weights in engine-room: including main engines, circulating engines, and other auxiliaries, condensers, and all pipes and fittings . . .	19·45 lb. per I.H.P.
Weight of boilers and water, funnels, casings, pipes and fittings in boiler-rooms . . .	26·2 lb. per I.H.P.
Total machinery weights . .	48·18 lb. per I.H.P.

We thus get 85·49 I.H.P. per ton of boiler-room weights, which is practically a confirmation of the figures obtained with the Swordfish. It is hardly necessary to go further, but it may be worth adding corresponding figures for the Desperate, another Thornycroft destroyer. She developed 5796 I.H.P. on her trial, with 397·6 revolutions, and 211 lb. boiler pressure, the air pressure being 3·5 in. The speed was just over 30 knots. Taking the same classification and order of weights as before given, the figures are 2·41 lb., 18·2 lb., and 24·6 lb. respectively per I.H.P.; or a total of 45·21 lb. of machinery I.H.P. In regard to boiler-room weights alone we have 91·05 I.H.P. per ton. As a further illustration of the fuel economy of express boilers, and also showing the range of action of torpedo-boat destroyers, it may be stated that the Entre-Rios, built and engined by Messrs. Yarrow for the Argentine Government, steamed from St. Vincent to Buenos Ayres, the distance logged being 4000 knots, without stopping for coal. She carried on starting from St. Vincent

145 tons of fuel, 15 tons of which were on board on arriving at the River Plate.

Great engine power in destroyers.

It may be said, and not without truth, that it is not fair to compare the machinery of small vessels, like the torpedo-boat destroyers, with big ocean-going ships such as cruisers. It must be remembered however, that though the destroyers are small, the power developed by their engines is great. The Desperate's engines on full speed trial exerted more power by over one-sixth than was given off by the Powerful's engines on her economy trial when steaming at the respectable speed of 13½ knots. In a recent address the President of the Institution of Civil Engineers called attention to the steamer Pennsylvania, built by Messrs. Harland & Wolff of Belfast, as being a vessel altogether remarkable on account of her size. She is indeed an enormous ship, being 585 ft. long by 62 ft. wide, and has a draught of 30 ft. She carries 20,000 tons of cargo and 1500 passengers. Her displacement reaches the impressive figure of 30,000 tons. The Desperate has a displacement of 272 tons and her power is almost equal to that of the Pennsylvania, for the latter is to have engines of 6000 I.H.P. which will give her a speed of 14 knots. Messrs. Thornycroft & Co. are now constructing a 32-knot destroyer, the Albatross, of which we have at the time of writing no particulars. There is no doubt, however, that she will be a little bigger than her elder sisters, perhaps 300 tons, and certainly she must be much more heavily engined; about 8000 I.H.P. would be the power required for the speed taking a line through previous performance. Messrs. Laird Brothers of Birkenhead have a boat in progress which is to steam 33 knots, but this will be a still larger vessel. Messrs. Yarrow & Co. have also in construction two 32-knot destroyers for the Japanese Government. In the Pennsylvania we have 1 horse-power to every 5 tons of displacement, in the Albatross we have 1 horse-power to every three-quarters of a hundredweight. In other words the ratio is as 3 is to 400. Such is the price paid for speed.

Fuel economy of express boilers.

In regard to fuel economy of the Thornycroft boiler, we find that the Ardent, a sister vessel of the Boxer, and having a duplicate installation of the latter's machinery, burnt 1·53 lb. of coal per I.H.P. per hour on an Admiralty trial. This compares favourably with the Powerful's figure of 1·7 lb. for the Belleville boiler. The speed of the Ardent on this economy trial was 13 knots, and the trial extended over twelve hours. The distance run per ton of coal was just on thirty-eight nautical miles.

Enough, perhaps, has been said to show that although there is a great difference between the conditions that have to be observed in a cruiser and in a destroyer, still the superiority in the matter of

weight is so enormous with the express boiler that it is difficult to resist the conviction that the Belleville type of boiler will in turn give way to the express type, though doubtless with some modification in design. In regard to space occupied it is not easy to say anything definite, as the fitting of express boilers to big ships has not yet been fully tried, but it will be remembered that in the last issue of the *Annual* the details given of the Dutch cruisers, which are to have both Yarrow and return-tube boilers in the same ship, showed that the former type of boiler occupied considerably less space power for power. One of our most prominent marine engineers has stated that he could get steam for 40,000 I.H.P. with express boilers in the same length of ship as is occupied by the boilers of the Powerful. It may be that express boilers will be placed on two decks or flats. The arrangement, however, would require a great deal of manœuvring of uptakes and chimneys, and the saving in space would not be so great as at first sight would appear. The suggestion of boilers on two decks is not, of course, a new one.

Accessibility of the Belleville boiler.

At the time the Powerful and Terrible designs were got out preference was given to the Belleville type because it was, as already stated, the one with which experience in ocean-going ships had been obtained. It was then considered that the ease with which the whole nest of tubes could be exposed by opening the doors which constitute the front casing, together with the facilities for cleaning the inside of the tubes due to their larger diameter, were features sufficient to turn the scale in favour of the French invention. In fact the Belleville system was the only one on which it was known that reliance could be placed. That was perfectly true of that day, but since then experience has been accumulating, and it is in favour of the express boiler as a trustworthy steam generator. The Speedy has been running long enough to indicate that her boilers are to be depended upon, and the general experience with the destroyers fitted with various types of express boiler confirms this view, in spite of untoward incidents in a few cases, which were due to a want of knowledge since gained. It has been found to be far easier to replace tubes of express boilers than was at first anticipated, and there is this to be said, that in positions where the source of power is so largely subdivided, as it is when water-tube boilers are used, one or two boilers can be laid off without seriously impairing the steaming power of the ship.

Messrs. Yarrow's experiment.

The position of the express type of boiler as an ocean-going steam generator has been further strengthened within the last few weeks by some experiments carried out on a torpedo-boat by Messrs. Yarrow & Co. These were undertaken with a view to showing that small

tube boilers of the express type can be safely run with sea water for considerable periods of time. It has been hitherto the general opinion of marine engineers that the admission of a small quantity of salt water to an express boiler would be fatal to it, and it is a proposition to which we think most designers of boilers of this type have given a tacit consent. Although it is not usual now to use salt water for making up the inevitable loss of feed water, yet it is impossible to guard against accidental admission of sea water through a defective condenser. The most convincing argument against the use of small tube boilers for continuous steaming at sea has been the possibility of a leaky condenser, and against this the advocates of the express boiler have had no reply. Messrs. Yarrow & Co., however, determined to put the matter to the test and the result was the trials referred to. The boiler in the boat was of the ordinary Yarrow straight-tube type, having tubes 1 inch external diameter. The boat was steamed off the mouth of the Thames for five days for from eight to ten hours a day, during which time sea water only was used for feeding the boiler. Frequently the salt and other mineral constituents were allowed to accumulate in the boiler until the density of the water reached three thirty-seconds, or three times the density of average salt water. This is near the extreme point of density allowed, and above that usually carried in the average marine boiler. After each trial the boiler was opened up, and was cleaned out. The worst report gives a deposit of no more than $\frac{1}{32}$-in. thick in the tubes and a light deposit on the upper drum, this being after an eight hours' run. Another trial was made with a Yarrow boiler on land. It was fed with salt water continuously and not blown off. Naturally, in time some of the tubes became salted up. There were 204 1-in. tubes in this boiler, forty-eight of which became completely blocked, some for about a third of their length. This deposit was of course mostly salt, and was removed by means of a straight diamond-pointed tool. The object of this experiment was to show the advantages offered by straight tubes in regard to clearing them of salt or accumulation of scale. Another example of the ability to use salt water in express boilers is afforded by a first-class torpedo-boat built by Messrs. Thornycroft & Co. and fitted with two of their water-tube boilers. This vessel steamed from the Thames to South America. Fresh water was used for feed during the first part of the voyage, but for the last fortnight salt water alone was employed. The boilers were not injured in any way, an official trial being made after the arrival of the boat.

All these considerations lead to the anticipation that small tube or express boilers, used either alone or, as in the Dutch cruisers, in

conjunction with the old return-tube description, may supplant the Belleville type. It may be stated that since the last issue of the *Annual* the Dutch Government has authorised the construction of three large cruisers, in which Yarrow boilers alone are to be used. Sir W. G. Armstrong & Co. have also in progress a cruiser for the Portuguese Government which is to be fitted with Yarrow boilers.

British and foreign vessels with express boilers.

The following is a list of vessels larger than destroyers which have been or are being fitted with Thornycroft water-tube boilers :—the third-class cruiser Geiser of 3000 I.H.P. and the turret-ship Skjold of 2200 I.H.P., belonging to the Danish Government; the torpedo gunboat Speedy of 4700 I.H.P., already mentioned, and the third-class cruisers Proserpine, Perseus, and Prometheus, each of 7000 I.H.P., and the Barham and Bellona, each of 6000 I.H.P., for the British Navy; a torpedo cruiser of 5500 I.H.P. for the Austrian Navy; a torpedo cruiser of 3200 I.H.P. for Norway; and the Ægir, a coast-defence armourclad of 5000 I.H.P. for Germany. Although these vessels are of larger displacement than the destroyers, it will be seen that the latter considerably exceed some of them in engine power. As stated in the last issue of the *Naval Annual*, the torpedo gunboat Spanker has been re-boilered with du Temple boilers, and the Pelorus, a third-class cruiser, has express boilers. Both these vessels have been tried, and the results are reported to have been satisfactory.

It will be seen from the above that our own Admiralty authorities have not been backward in extending the use of small-tube boilers for larger vessels. It is at any rate satisfactory to know that in the Engineering Department at Whitehall there are officials whom we now know to possess the courage to make any change desirable for the good of the Navy.

The Inchmona.

The introduction of the water-tube boiler and the possibility thus opened up for increased pressure, has not led to another step in compounding of engines, but it can hardly fail to do so sooner or later. In the merchant service, however, we have seen four-stage compound engines adopted with success, notably in the case of the Inchmona, a cargo vessel already referred to, the machinery of which was designed by Mr. Thomas Mudd of Hartlepool. There is a combination of unusual features in this ship which render her especially interesting to engineers whether of the Navy or Mercantile Marine. Her appearance has been, next to the trials of the Powerful and Terrible, the most interesting marine engineering feature of the year. The main set of engines has no less than five cranks, the cylinders being all, excepting the high-pressure cylinder, jacketed with steam considerably above initial pressure. There is a heating arrangement which brings the temperature of the feed

almost to that of the water in the boiler, the fires being urged by induced draught passed through air-heating tubes. The boiler has Serve tubes and the steam is super-heated. It will be seen that Mr. Mudd has not feared novelties, and has spared no pains to get the utmost from his coal. The result has been that on a two days' trial the fuel consumption was found to be 1·07 lb. of north country coal per I.H.P. per hour. The result, of course, is remarkable, and brings us, supposing best Welsh coal were substituted for north country fuel, within what was long looked upon as the marine engineer's ideal limit of unit weight of coal per unit of power. The boiler pressure was 250 lb., which may be taken as a standard for four-stage compounding. Whether the satisfactory trial results will be maintained in practical work over an extended period is a fact that may be left for time to prove before discussing at length, from the economic side, the various unusual features in this very advanced "ocean tramp."

Five-crank engines.

It will, however, be profitable, as the four-stage compound engine must come to the front, to repeat a few of the reasons which induced Mr. Mudd to adopt the particular design placed in the Inchmona. The quadruple compounding is the logical result of the steam pressure, but it would at first sight appear that four cylinders with four cranks would be the natural arrangement to adopt, considering how well four-crank triple-compound engines — the low-pressure cylinders being a pair—have answered in ships of various descriptions. If the four cranks were set at right-angles, in order to give regularity of impulse and to balance the crank-shaft itself, there would be but four impulses to each revolution, as in the two-cylinder engine, because two pairs of pistons act together. On the other hand, a three-crank engine would have six impulses per revolution, as the beats of no one piston would be simultaneous with those of another. The same reasoning applies to higher numbers of cylinders, and, arguing on these premises, Mr. Mudd determined that "the broad expression of the situation is, that the number of cranks should be any odd number greater than one;" it being, of course, remembered how desirable it is to equalise the turning-moment of the crank-shaft as much as possible, provided the result can be secured without unduly sacrificing other features. With the quadruple-compound engines of the Inchmona it was, therefore, decided to have five cylinders. But there were other reasons which supported this decision: by dividing the low-pressure cylinder in two equal parts or rather having twin low-pressure cylinders, the ratio between the smallest and largest cylinders became at once reduced; and, indeed, three of the five cylinders were so nearly of the same diameter as to

give no trouble in making their pistons of exactly the same weight. Further, by a little scheming, such as making some of the pistons of steel and others of iron, or by varying the depths, it was possible to arrive at an equality of moving weights with all cylinders. With the five-crank arrangement the number of impulses per revolution rises to ten, and they occur at regular intervals of time. The value of equal impulses and the equalisation of the weights of moving parts, as well as fore and aft balancing of engines, was demonstrated by Mr. Yarrow in his now historic paper read before the Institution of Naval Architects in 1892, and also by Mr. Schlick in his communications to the same society.

The steam turbine.

A still more original departure in marine engineering, although on a much smaller scale, is contained in the machinery of the Turbinia, a torpedo-boat built on the Tyne, to practically illustrate the application of Parson's steam turbine to the propulsion of vessels. She is 100 ft. long and 9 ft. wide, her displacement being 44½ tons, including 7½ tons of coal and water. On trial she is said to have run at a speed of 29·6 knots. There is one water-tube boiler with 1100 square feet of heating surface and 42 square feet of grate. The propeller runs at 2400 revolutions per minute. The main engines weigh 3 tons 13 cwt. complete, and consist of high-pressure, intermediate, and low-pressure steam turbines, each coupled direct to a screw shaft. Each shaft carries three propellers, which are naturally of small size. The expansion in the engines at full power is 150 fold, a ratio which may be compared to the 16 or 20 expansions general with ordinary marine engines. The consumption of steam at full power is estimated at about 13 lb. per I.H.P. per hour, and the estimated horse-power is about 1800 indicated. The total weight of machinery complete, including boiler, engines, auxiliary engines, shafting, screws, pipes, and tanks (but exclusive of water in tanks) is 22 tons. No aluminium or special weight-saving refinements have been used. It will be seen from these details that the Turbinia is altogether an extraordinary craft, perhaps the most surprising vessel that has been built since Mr. Thornycroft astonished Naval architects with his little river launch twenty-five years or so ago. At the time of writing, Mr. Parsons has not quite completed his experiments, and hopes to get yet better results. As might be anticipated from the remarkably high number of revolutions and the novel arrangement, one of the chief points requiring consideration has been the proportioning of the screws, and at the time of writing new screws are about to be tried.

G. R. DUNELL.

CHAPTER XI.

Recent Naval Literature.

When the history of Her Majesty's reign comes to be written, without doubt one of the most significant things to be recorded will be the vastly increased interest taken by Englishmen in the question of Naval defence, and not their interest only, but the quickened consciousness numbers of them have displayed as to what that defence really is. We should go very far to find a parallel for this awakening of public opinion. No appalling catastrophe and no signal manifestations of sea power gave the seed of knowledge which has struck deep roots in the public mind. The end has been reached by intellectual processes, through clear-sighted and absolutely convincing deductions from the events of the past, the sagacious expositions of Naval historians, and the sterling work of prominent seamen—these coinciding with the development of the Imperial idea, the new conception of colonial expansion, and the sounder grasp of the unexampled position of the Empire among the Powers of the world. Twenty-five years ago the subject of Naval defence, regarded in its essential elements, was almost foreign to English thought. The magazines and reviews of the time bear scarcely a trace of any movement of opinion on this matter. No interest in questions of Naval strategy or tactics would have been betrayed by any but professional men, and these saw, as it were, through a glass darkly. Naval history was relegated to the dry-as-dust chronicler; Naval biography, as such, scarcely existed.

Increase of public interest in, and knowledge of, Naval affairs.

Now, however, as Carlyle might have said, the torch of knowledge has been so brandished abroad that well nigh every nook and cranny is illuminated. Not only has the work of teaching the public been carried on by Naval professional writers such as Admiral Colomb, Captain Mahan, Commander Robinson, and Professor Laughton, but by military officers like Sir George Clarke and Major Callwell, and by journalists and writers like Mr. J. R. Thursfield, Mr. David Hannay, Mr. H. L. Swinburne, Mr. H. W. Wilson, Mr. G. W. Steevens, and Mr. Edward Fraser. By the work of these and many more, a great body of public opinion has been formed, and on the occasion of the discussion of Naval needs a sound knowledge of

Naval literature and public opinion.

essential facts and principles is often displayed. The Navy League is pursuing its work with surprising energy and, it may be, even superabundant zeal, and the Navy Records Society carries on unostentatiously its useful labour of opening up the sources of Naval history. The arousing of public interest in the Navy had been proceeding many years when the Naval Exhibition of 1891, followed by an exhibition at Liverpool in the following year, gave new impulse to it. But the agencies at work in the revival are too widely distributed to be easily traced. They have operated mostly through literature and the periodical press, and have been inspired chiefly by the writings of Captain Mahan. Although Admiral Colomb's "Naval Warfare" preceded by a little "The Influence of Sea Power" in the order of date, it follows in the logical sequence, for, while the American officer deals with the broad operation of sea power, the Admiral has illustrated the special manner in which that power has been expressed; and it may be said that Professor Laughton's masterly illustrations illuminate the two. In a recent volume of collected Naval essays, dealing at large with the question of Imperial Defence, from the pens of Lieut.-Col. Sir George S. Clarke and Mr. James R. Thursfield,* the latter writer very happily says that Captain Mahan is more historical than the strategists, more strategic than the historians, and more philosophical than either. His method is analytical of sea power, its sources, its conditions and its results; and, while his grasp of strategic issues is almost unrivalled, his insight into the philosophy of Naval history is altogether unprecedented in literature. His volumes were inevitably accepted as final, and, in the true sense, were epoch-making. Taken with the writings of Admiral Colomb and others, they form a body of Naval doctrine, from which, save, perhaps, on a single point—that of the value of a "fleet in being"—there can be no dissent.

Recent volumes on Naval history, strategy, etc.

Before attempting to analyse the principles of sea power as applied in the defence of the British Empire, and as expounded in the essays of Sir George Clarke and Mr. Thursfield, it may be interesting to survey briefly the extent of the illustrative Naval literature of the past few years, from some volumes of which points of elucidation may be drawn later on. With the works of Admiral Colomb and Captain Mahan must be linked Professor Laughton's "Studies in Naval History," and Major C. E. Callwell's "Effect of Maritime Command on Land Campaigns since Waterloo." This last-named volume, which has recently been published, is, indeed, a continuation of Captain Mahan, the subject being specialised to its immediate purpose. It is a ripe and scholarly illustration of the same theme,

* "The Navy and the Nation, or Naval Warfare and Imperial Defence" (John Murray, 1897), of which this chapter is, to a great extent, a review.

wherein the most interesting points are found in campaigns which, at first sight, seem to have had little to do with the sea, and in the demonstration that, in land campaigns, preponderating power at sea will often compensate for disproportionate military forces.

That signal illustration of sea power, the defeat of the Armada, has been shown in its true light in the two volumes of Professor Laughton published by the Navy Records Society. Captain Duro, on the Spanish side, has published an abundance of evidence upon the same matter, and the later volumes of Professor Froude, though tinged with the characteristic bias of the writer, are admirably vivid and undeniably useful. With these may be mentioned a new edition of Southey's "English Seamen"—Howard, Clifford, Hawkins, Drake and Cavendish. Commander C. N. Robinson's "British Fleet," dealing alike with the history and functions of the Navy, and with the varied details of its constitution and usefulness, has passed through three editions, and is everywhere regarded as a text-book of its subject. Capt. Eardley Wilmot's "Development of Navies during the Last Half-Century" is an admirable *précis*, while Mr. Wilson's "Ironclads in Action" is a careful survey of the operations of the steam Navy. Besides books like these—and the list is not exhausted—must be mentioned such special essays as Professor Laughton's pamphlet, the "Story of Trafalgar," and his more recent "Trafalgar Memorial," and a number of magazine articles lately published on Trafalgar, the Nile and the battle of Copenhagen. Foreign writers have scarcely been less active in investigating Naval history, and it is but necessary to mention the works of Jurien de la Gravière and Duro; the great series of volumes on the Pontifical and other Italian Navies of the late Padre Guglielmotti; the "Storia Generale" of Signor Vecchi, lately republished; the writings of Captain Chevalier, Commander Chabaud-Arnault and Lieutenant Loir, of Herr Luebeck ("Das Seewesen der Griechen und Römer"), and Signor Corrazzini ("Storia della Marina Militare Antica"), as illustrating how many hands have been put to the work. Mr. C. Torr's "Ancient Ships," and Mr. Oppenheim's laboriously accurate survey of the history of "Naval Administration," with his "Naval Accounts and Inventories, Henry VII.," and Mr. Tanner's "Hollond's Discourses of the Navy, 1638 and 1659" (the last two being volumes of the Navy Records Society), are illustrations of other classes of Naval literature. Mr. Hannay, too, is now completing a "Short History of the Navy."

Naval biography.

With these works we have a flood of Naval biography. Professor Laughton's "Torrington" and "Nelson," with his many brief lives in the "Dictionary of National Biography;" Mr. Hannay's "Blake" and "Rodney," and his "Hood's Letters" (N. R. Society); Captain Mahan's

"Farragut" and his "Nelson" (forthcoming); Mr. Clark Russell's "Collingwood;" the Hon. J. W. Fortescue's "Dundonald;" the "Life of Captain Stephen Martin" and the "Journal of Rear-Admiral Bartholomew Jones" (N. R. Society), are but representatives of a large class. They are supplemented by others of current interest. Of these the biography of "Admiral of the Fleet Sir Geoffrey Phipps Hornby, G.C.B.," by his daughter, Mrs. Fred Egerton, gives a picture of the fine seaman who, as "Uncle Geoff," endeared himself to the whole fleet, the representative of those who were trained in the sailing Navy, and who yet grasped the conditions imposed by steam—a seaman who was also a statesman, steering England through a crucial difficulty, where a false step would have been fraught with immense danger. Another example is the "Life of Admiral Sir George Tryon," by Rear-Admiral C. C. Penrose Fitzgerald, a biography of the seaman who, in the conduct of the fleets under his command, displayed great qualities as a strategist and tactician, who devoted his career towards the perfecting of the service, and who perished in a disaster, which, by its lesson, was scarcely less instructive than his life. Outside the lists of such books as these there are other voluminous classes. Some are specially professional, dealing with tactical methods, and are found in almost all languages. Others, again, are technical, as is the case with some volumes in the new series of "Royal Navy Handbooks," edited by Commander Robinson, though certain of these, like Sir Vesey Hamilton's "Naval Administration" and others promised, traverse larger ground. Not a few are critical of administration or the present situation. To this class, for example, belong Mr. G. W. Steevens's "Naval Policy," which is a searching and careful, if not altogether convincing, exposition of our needs, and some volumes dealing with the incidence of the Declaration of Paris and other such matters.

Necessity of "command of the sea," the informing principle of this literature.

This brief survey will show that Naval literature has grown to a great volume, with many varied departments—a bewildering array, it might be thought, were it not that "command of the sea" is now accepted as the gauge of security. All history illustrates how sea power has been exercised, and how command of the sea has decided, or how disputed command has affected, the issue of campaigns and wars. All biographies show how men have been engaged in this great drama. All technical treatises deal with the machinery they have employed or must employ. As Englishmen, we ask how in this matter we stand? How shall command of the sea be won and held, and how employed for the protection of the kingdom and the empire? In what does it consist? The answer is to be found in the various essays included in the volume of Sir George Clarke and Mr. Thursfield.

"The Navy and the Empire," its ruling idea.

As the authors remark in their introduction, the several subjects to which their collected essays are devoted are intimately co-related. One ruling idea pervades all alike. It is, as has been suggested, the idea of command of the sea, and this command, as Mr. Thursfield says, is the beginning and end of sea power. It includes all the rest. Command of the sea means freedom of military transit in the first place, and of commercial transit in the second, and the latter results from the former. There is also necessarily implied the power to forbid that command to the enemy. The plain teaching of reason, without illustration, is that the loss of command of the sea would lay us open to invasion—though invasion might not follow immediately—and our transmarine possessions to military attack. "The bonds of empire would *ipso facto* be sundered." Without freedom of transit there would be no possibility of protecting them, a manifestly logical conclusion resulting from the premises.

"Moreover, the command of the sea is not merely the tenure by which alone we hold the Empire; it is also the title, the indefeasible title, by which we can at any time claim the transmarine possessions of any European Power which cannot defeat us at sea. Every Power in the world holds all its transmarine possessions merely as the caretaker of the ultimate Naval Power. If England is that Power, every such possession is hers for the trouble of taking it whenever she is at war with the Power which holds it. If she is not, her Empire is at an end, and her very existence as an independent nation must ever be at the mercy of her victorious foes. This, and no less than this, is the strategic meaning of the command of the sea. To the British Empire its possession means security, its loss annihilation." (p. 151.)

The "fleet in being."

But leaving for a while the manifold imperial advantages conferred by command of the sea, let us consider now how, in the first place, it concerns the British Islands. It is, as this volume, with iteration, demonstrates, an absolute bar to invasion; but it must be observed that the authors are of opinion that something less than absolute command will secure us. The "fleet in being," undefeated, and able to avoid a decisive engagement, is held up as a not less absolute bar. The argument is urged with great cogency, and Torrington's strategy is marshalled, with a wealth of illustration, in support of the contention. Admiral Colomb and Prof. Laughton have maintained the same view, though apparently with special limitations. The "fleet in being" was attacked with caustic wit in *Macmillan's Magazine* in 1895 by a writer whose personality was easily recognised, and he, with the other writers just named, discussed the matter thoroughly in the columns of the *Army and Navy Gazette* in August and Sep-

tember of that year. I do not propose to discuss it afresh. Major Callwell entirely dissents from the opinion that a "fleet in being" has necessarily effective value. For him it is enough to know that Miaulis lingered inactive in the Cyclades in 1825 while Ibrahim landed troops in the Morea, that a Russian fleet was in being at Sebastopol in 1854, and that Ting was at large when the Japanese invaded Korea. It is probable that the difference between these writers is less than might at first sight appear. Mr. Thursfield admits that the fleet in being may be temporarily evaded with success. The fleet that all look to for protection is an effective and potential fleet. Some conditions must exist that enable it to remain in being, and at the same time to be a potential, mobile force capable of exercising a decisive threat. It must be strategically at large. It cannot be blockaded or masked. To discuss the "fleet in being," or to deal at length with the Navy as the safeguard against invasion, is unnecessary here. "Can England be Invaded?" asks Sir George Clarke in the volume under discussion. "That Naval force is the natural and proper defence of a maritime State against over-sea invasion," he answers, "is the indisputable teaching of history." The lesson cannot be read otherwise. The conditions of security are well described: "All the great operations of war are ruled by the measure of risk involved, and, until the defending Navy has been crushed, the risk of exposing large numbers of transports to attack is too great to be easily accepted." The necessary conclusion is that the Navy must be so constituted as to be beyond the crushing power of any assailant.

Invasion and food supplies.

In regard to the question of invasion, Mr. Thursfield argues forcibly that an enemy who had vanquished our fleets could reduce us to submission without landing a man on our shores, and this because, having wrested from us command of the sea, he could intercept all but a small proportion of our vast commerce and the scarcely calculable bulk of our food supplies committed to the sea. "It is not so much actual starvation that we have to fear. There is always food enough in the country to maintain its population for six months or more. But with our mills standing, our forges silent, our furnaces cold, and our mines closed, where is the teeming industrial population of our land to find the wherewithal to buy its food? There is no arguing with an empty belly. The working man is now in the last resort the arbiter of our fate. Can any one doubt that a Government which resolved to fight on after the command of the sea had passed into the hands of our enemies, would be swept away like chaff before the wind?" (p. 55.)

Blockade running.

A great deal has been made in some quarters of the achievements of blockade-runners, and some have even argued that these adven-

turers would be so successful in their operations as to keep our granaries and larders well stocked, and so would confer endurance upon us. But very little consideration will show that this argument is untenable. It is not so much, as Mr. Thursfield says, actual starvation that we should dread. Those who have read Mr. Taylor's recent volume upon "Blockade Running in the American Civil War," will have come to the conclusion—although, in the introduction to the book, the argument alluded to is upheld—that blockade-runner seek great prizes as the reward of their hardihood, and that necessarily ruinous prices would impose famine upon the poor.

Commerce protection.

Indissolubly connected with the protection of food supplies is the defence of commerce. This matter is treated in several sections of "The Navy and the Empire," but most directly in a chapter by Mr. Thursfield, who enforces the point that our commercial interests differ not merely enormously in degree, but altogether in kind from those of any other Power, inasmuch as we exist by maritime commerce, and cannot exist in any other way. He estimates the total value of British commerce at sea at the stupendous figure of £1,750,000,000, and it is to protect this in time of war that we have to be prepared. Now, safety of commerce, like security from invasion, depends upon command of the sea, and unless that command is assured, there can be no guarantee for commerce. With such command convoy will ensure absolute immunity from attack, but, of course, in all cases privateers will be abroad, and the convoying force must be equal to its duties. The capture of the Mediterranean trade, escorted by Rooke, in 1693, of the East and West Indian trade convoyed by Captain Moutray, in 1780, and of the St. Eustatius booty in 1781, are instances of what has happened when escort has been inadequate. Admiral Colomb, in his "Essays on Naval Defence," has dealt with this matter carefully, and it was discussed from the historical side, in regard to the revival of blockade and the question of patrol, by Prof. Laughton in the *Naval Annual*, 1894. The matter must not, therefore, be dwelt upon further.

The Declaration of Paris.

There remains, however, the question of the Declaration of Paris, as the instrument which, upon paper, abolishes privateering, and excepts from capture an enemy's goods, save "contraband of war," when carried in neutral bottoms. This was hailed, at one time, as giving a guarantee under which commerce might traverse the seas in safety. Those who read Sir George Clarke's trenchant chapter upon "National Insurance" in the "Navy and the Empire" will come to the conclusion that, after all, the Navy is "the one thing needful," and that no instrument like the Declaration of Paris can be a safeguard. The chapter was written in relation to the proposal for a system of

national insurance made by the late Sir George Tryon, and is mainly in criticism of Mr. Gibson Bowles. Sir George Clarke leaves no doubt upon the minds of his readers that no wholesale transfer of our shipping to a neutral flag is possible. "No weak Naval Power could possibly become the custodian, temporary or permanent, of the trade of the British Empire." Belgium, Holland, Denmark and Sweden have been mentioned, but is it conceivable that a strong Naval belligerent would be thwarted by the flag of any of these? But it has yet to be shown, as Sir George Clarke says, that any great transfer is possible. Lord Charles Beresford, in his address to the London Chamber of Commerce in 1893, showed very plainly that it is impossible, remembering that an express condition is that "the captains and crews have to be, if not entirely, almost wholly of that nationality whose flag is represented at the peak," that France will not recognise the transfer unless it take place before the declaration of hostilities, and, moreover, that "contraband of war" has never been defined, but that it may well include rice, coal and even corn. Thus, once again, as the writers of this admirable book tell us, by the Navy we stand or fall.

Blockade, etc.

We are therefore brought back to the consideration of command of the sea as it must be exerted in these days. Mr. Thursfield says truly, in discussing it, that the changes in the materials and appliances of Naval warfare have scarcely at all affected the broad issues and conditions of this strategy. But it is equally true to say that the tactical methods involved are necessarily changed. We seek the examples of them in the Naval manœuvres. Mr. Thursfield has so often treated these in the *Naval Annual* that its readers are familiar with his expositions. There is, however, a chapter from his pen in the volume under consideration which puts certain conclusions very clearly. The manœuvres of 1888 were in many ways momentous but mostly so in the light they threw upon the conditions of modern blockade. It will be remembered that Sir George Tryon and Admiral Fitzroy escaped from Berehaven and Lough Swilly despite the vigilance of Admirals Baird and Rowley. From Admiral Penrose Fitzgerald's recent "Life of Vice-Admiral Sir George Tryon," it appears that the commander at Berehaven had not entered upon his task with any hope of success. He matured his plans, however, with consummate skill, and before the period of inactivity imposed by the Admiralty on the blockaded forces—unknown to the blockaders—had expired, Rowley had written to Baird to say his officers and men were so exhausted that he would be compelled to raise the blockade. "This proves," Mr. Thursfield says, "not that blockades are impossible, but that the methods of blockade adopted in 1888

must be modified in accordance with the experience gained." They were modified, as we know, in 1890, and both Mr. Thursfield and Admiral Fitzgerald (in his Life of Tryon) show how the lesson had been learned. Tryon was now in command of the British Fleet and Baird of the enemy.

"Instead of blockading Baird in his protected ports, Tryon was instructed to watch him from his own base, to act on the offensive as far as circumstances might permit, but not so far as to interfere with the primary object of defending the shores of Great Britain against the assault of an enemy permitted and even invited to take the sea. In the result Baird's attack was foiled, and the flower of his fleet was captured. Once more it was shown that an inferior Naval force, acting on a vigorous offensive, is exposed to such tremendous risks of defeat, capture and destruction, that a prudent enemy would be forced to think twice or thrice before he engaged in so desperate an enterprise." (pp. 82, 83.)

For a policy of observation, an adequate force of cruisers is essential, and Mr. Thursfield again and again shows—and later manœuvres than his chapter deals with have further illustrated the matter—that want of intelligence opens the door to disaster. "The Navy and the Nation" is full of instruction on these and many other matters that are related to command of the sea, including a discussion on the effect, though ultimate futility, of the *guerre de course*, but many of its chapters need not be dealt with here.

Colonial Defence.

There is one aspect of the book, however, to which attention should be drawn. It is the firm grasp it shows of the question of colonial defence, and of the intimate relation which exists between Naval supremacy and the prosperity of the outlying portions of the Empire. The defence of the colonies is, of course, wholly bound up with the question of "command of the sea." Without this, they must fall to the ultimately victorious Power. "It is on the Channel squadron, the Mediterranean squadron, the Indian squadron, that the real security of Australasian coasts and territory depends." This is the true strategical principle. And it is by virtue of the protecting presence of the Navy, its "noiseless power," that colonial commerce has grown and prospered, and that the colonies have been able to borrow cheaply the money without which their development would have been impossible.

Defence of India.

India is, of course, upon a different footing, and the same may be said of Canada. There is one remark in the "Navy and the Nation" which seems open to misconstruction. The authors rightly insist that, above and beyond the details of local defence, lies the domain of national policy, and they ask: "Did the inevitable advance of

Russia from the Caspian to the frontier of India imperil our Naval supremacy?" And the answer given is: "If not, of what use were the flood of declamation and the protracted diplomatic warfare, each alike undignified and futile, of which the sole result was the estrangement of two nations which have no real cause of disagreement?" Literally taken, this sentence might be understood to imply that the Navy alone would suffice for the defence of India. The authors, however, do not hold any such view. They know, indeed, that without the Navy India cannot be defended, and for their purpose—more especially since they believe that India will for many long years remain unassailed—it was unnecessary to insist upon the obvious need of military defence of the frontier.

Lord Carnarvon's "Defence of the Empire."

The whole tone of the book shows the healthiest sense of the conditions of Imperial Defence. It appears appropriately with a smaller volume, edited by Sir George Clarke, entitled "The Defence of the Empire" (John Murray), being a selection from the letters and papers of the late Lord Carnarvon. Here we have a picture of the life-work of a far-sighted statesman, who, long before most men had turned their thoughts to the subject, had grasped the real principles of Imperial Defence, and mainly through whose earnest labours the coaling stations and other bases and supports of the fleet have been fixed and defended. The two books together, regarded with the recent literature here slightly reviewed, are most significant contributions to their great and vitally important subject. I cannot conclude better than in the words of a paragraph in one of Mr.

The "only cheap Navy."

Thursfield's chapters: "There are only two alternatives: either we must leave our possessions—including in that term our maritime commerce and its security—undefended, and run the risk of losing them, or we must adopt such measures for their defence as are manifestly sufficient, or at least not palpably insufficient, to protect them. There is no middle course in the matter. A Navy which is not strong enough to defend our vital interests in time of need is not worth its cost, however cheap it may be. A Navy which is strong enough to defend us is cheap, whatever its cost may be. To a nation situated as England is situated, the dearest Navy she can have is a weak Navy. The only cheap Navy she can have is a Navy strong enough to defend her." This is the soundest lesson of Naval literature, and it is in support of this position that the miscellaneous, but organically-jointed, essays on "The Navy and the Empire" have been penned and collected.

JOHN LEYLAND.

CHAPTER XII.

Manning.

Increase in permanent force.

The publication of the Navy Estimates, which have been fitly described as "Manning" Estimates, and the announcement that further large additions to the *personnel* are in contemplation next year, render it necessary to deal briefly with the policy of manning in these pages. The supply of officers, which had been placed on a satisfactory footing on the lines recommended by Sir Anthony Hoskins' committee, has again become deficient owing to recent increases in the number of ships built and building. A reference to the First Lord's Memorandum in Part IV. will show that the subject is receiving the full attention of the Admiralty. In this chapter our remarks are confined to the supply of men. For the year 1897–8 an increase of 6300 men in the permanent force is proposed, bringing up the total numbers voted to 100,050. The proposed additions are thus distributed :—

121 officers.
2,400 seamen.
265 engine-room artificers.
2,000 stokers.
1,000 marines.
514 artisans and miscellaneous ratings.

Dependence on Reserve.

Those responsible for the publication of the *Naval Annual* have consistently urged in these pages and elsewhere that for the manning of the Navy in time of war we ought to depend more largely on well-trained Naval Reserves. To maintain in peace time in the ranks of the Navy such a large proportion of the numbers required for war is to impose a very heavy burden on the resources of the country. Besides the actual pay of the men while serving in the fleet, the cost of training, of the Naval Barracks, of the additional ships that have to be kept in commission for giving the necessary practice at war, and above all the large increase in the non-effective vote, must be taken into consideration. From our point of view the large increase now proposed is to be deprecated. On the other hand it must be admitted that the success of the experiment instituted in 1894 in the Northampton, extended last year in the Curacoa, and to be further extended this year by the commissioning of the Calliope, does mitigate, if it does not remove, the second of the above

objections, *i.e.*, the cost of training. The lads trained in these ships have been reported upon as satisfactory. If it is possible, as apparently it is possible, by taking lads at a later age than that at which they have hitherto been entered, and by giving them six months' training in a sea-going ship instead of two or three years' training in a harbour ship, to turn out as efficient seamen for the Navy, the cost of adding to the permanent force will be very materially reduced absolutely as well as relatively to the cost of the Naval Reserve. Though making this admission, it does not alter the opinion already expressed that it is to a development of Reserves rather than an increase of the permanent force that we should turn to provide for the increased war requirements of the Navy in the way of men.

Efficiency. New regulations for Reserve.

The writer has always urged that it is useless to increase the numbers of the Naval Reserve unless steps are first taken to secure greater efficiency. These steps have been taken, or are in course of being taken. The new regulations, to which the First Lord devotes a considerable section of his explanatory statement, are a genuine attempt to make the Reserve a really efficient force, and cannot be too highly commended. For the future, all entries in the "First," or as it is now to be called "Qualified Seamen," class will cease. Except bluejackets who have completed their Continuous Service Engagements in the Navy, all seamen joining the Reserve will be entered in the "Seamen," or second class. Within their first term of enrolment they will be required to pass through a period of six months' training in the Royal Navy, upon the completion of which they will, subject to certain conditions as to health, etc., be promoted to the first or "Qualified Seamen" class. If they do not go through this period of training they will be dismissed. Steps having been taken to secure efficiency, it is to be regretted that such a paltry addition to the Naval Reserve as 1100 men (viz., 600 seamen and 500 firemen) is proposed, and that provision is only made for training 1200 men in all or 600 men at one time during the coming year. The reason is no doubt to be found in the fact that in spite of the large increase to the number of ships in commission, it is already difficult to give to the men of the Royal Navy sufficient practice at sea. The large additions to be made to the permanent force will accentuate the difficulty of giving training in the Fleet to the Reserve in future years.

Effect on recruiting.

Many newspapers which have commented on the revised regulations for the Reserve have expressed the opinion that they will act as a deterrent to recruiting. It is possible that they may have that effect as far as the seamen of the Mercantile Marine are concerned; but they should have just the contrary effect with the most immediately available source of supply—the fishing population. The

prospect of promotion to the first or "Qualified Seamen" class—thereby earning the higher retaining fee of £6, and a pension—should act as a great inducement to fishermen to join the Reserve. Any deterring effect the new regulations may have on recruiting could certainly be overcome by reducing the pensionable age to fifty-five, or by increasing the retaining fee to £8 or £10.

Short service.

The manning of the Navy during the past year has received a very large amount of public attention. It was selected as the subject for the gold medal prize essay by the Council of the United Service Institution and produced valuable papers from Commander J. Honner, Captain Eardley-Wilmot, R.N., and others. Commander Honner, while admitting that, on the score of expense, it is impracticable to enter sufficient service ratings to meet all the requirements of the fleet, is of opinion that the existing Reserve is not equal, by its constitution or training, to the position it now occupies in the scheme for manning the fleet. He urges that a Reserve should be created by enrolling men for five years' service in the Navy, after which they would serve five years in a second-class Reserve and fifteen years' in a third-class Reserve. They would be called first-class reserve men while serving in the Navy. Captain Eardley-Wilmot advocates a short service system, under which men would serve seven years in the Navy and up to fifty years of age in a Reserve. Lord Charles Beresford, in an address before the Liverpool Chamber of Commerce, has also urged the creation of a first-class Reserve by a short service system, and a second-class Reserve by giving two months' training in the year instead of one as at present, and increasing the retaining fee from £2 10*s.* to £8. As to numbers, Lord Charles Beresford estimates that by his proposals a Reserve of 70,000 men would be created in ten years. Commander Honner estimates that by his scheme in ten years a Reserve of over 18,000 seamen class, and 5500 stokers would be raised, while the ultimate total strength, which would not be reached till twenty-five years had elapsed, would be 40,000 seamen class and 11,000 stokers.

Lord Hood of Avalon, who was recently First Sea Lord at the Admiralty, in the *Times* of 3rd November, rejects the idea of maintaining the *personnel* of the Navy in time of peace on a war footing, and proposes that the existing Reserve should be raised to a strength of 30,000 men, principally from the fishing population. He does not contemplate any important changes in the organisation or training of the Reserve beyond making promotion from the second to the first class depend solely on efficiency.

Objections to short service.

The objections to the institution of a short service system are, in the opinion of the writer as he has already stated in the *Nineteenth*

Century, fatal to the proposal. The first is that which Earl Spencer urged in the House of Lords. If two classes of the permanent force, engaged for different periods, were serving indiscriminately in the same ships, it would inevitably lead to a shortening of the longer period of service. Secondly, men who had served their earlier years in the Navy would not take kindly to the merchant service, where the conditions of employment are not so good. Thirdly, the short service system is very costly in proportion to the results attained. A fourth objection is touched on by Admiral Colomb, in a letter to the *Times* of 18th August. He speaks of the proposal to divide our seamen into a long service and a short service body as an impossible one because of the difficulty of giving the short service men the full training at sea which it is already hard to provide for the long service men.

Development of Reserves.

The alternative to the institution of a short service system is to develop the existing Reserves. It is to be hoped that the new regulations will attract into the Reserve a considerable number of the bluejackets who leave the Navy after completing the first period of engagement. More than this is required. The men of the Naval Reserve proper are drawn from the fishing population and the Mercantile Marine. The fishing population can be alone relied upon to yield at once a substantial body of recruits. For some reasons it is more desirable to recruit fishermen than merchant seamen for the Reserve. Fishermen would certainly be available at short notice; and the withdrawal of a large number of men from the fishing trade would be less serious to our national interests in time of war than the withdrawal of men from the Mercantile Marine. The number of fishermen in the Reserve should be raised to 20,000 and ultimately to 30,000.

Mercantile Marine.

The Mercantile Marine has been almost exhausted as a source of supply, and if the proportion of foreigners continues increasing at the present rate, the number of Reserve men employed will probably diminish. There is no question of graver national importance than the present condition of the manning of the Mercantile Marine. Under present circumstances, it is exceedingly difficult for a British boy to become a merchant seaman. British sailing-ships do not, as a rule, carry "boys," and the "boys" carried in steam-ships certainly do not become seamen. Some substitute for the old system of apprenticeship must be found which will man British ships with British seamen. Under modern conditions the Mercantile Marine cannot be expected to be the same support to the Navy as it used to be in the past; but it should contain a valuable potential reserve of men as well as of officers. In three years' time it might be able to supply 15,000 men, whether seamen or stokers, for the Reserve—a number which might ultimately be doubled.

A further source of supply for the Naval Reserve undoubtedly exists in the fishing and seafaring population of the Colonies. On a recent voyage round the world, the writer made diligent inquiries on this subject. Newfoundland, Canada, and Australasia could furnish good material in considerable quantities. There is no reason to think that the estimates given in the last volume of the *Naval Annual* were exaggerated. We should be justified in expecting a supply of 5000 men in the near future which, in course of time, might be raised to 10,000 or 15,000 men. Colonies.

There could be no more fitting commemoration for the longest reign in the history of the country which depends for its existence on sea-power, than the institution of an Imperial Naval Reserve. Under present conditions, the Colonies cannot be expected to make any serious money contribution to the Naval Defence of the Empire, but they could help us, and help us very materially, with men. Imperial Naval Reserve.

It is with much regret that the writer again raises his voice in protest against what the *Manchester Guardian* calls "the extreme expensiveness of our present system of manning the Navy up to its full war complement." The cost of that system must inevitably increase. The Non-effective vote alone, which for the coming year stands at £2,180,000, will be well over £3,000,000 before we reach the end of the first decade of the twentieth century. Naval officers naturally prefer a bluejacket to a Reserve man, and those responsible for the administration of the Navy are possibly justified in demanding that the Navy should be manned with the best material that can be obtained, irrespective of cost. Parliament and the country are willing at the present moment to provide the funds for carrying out the policy of the Admiralty. Should a reaction come, as it probably will come sooner or later, it is in the shipbuilding vote that economies will be effected in the future, as in the past, possibly with serious danger to the Naval supremacy of the country. Objections to present policy.

In conclusion, it must always be borne in mind that the difficulty of giving efficient training in time of peace is at the root of the problem of manning the Navy in time of war. Every addition to the permanent force makes it harder to train the Naval Reserve. Six months' training in the Navy has been accepted as adequate to make an efficient Reserveman. For the continuous service man employment has to be found during practically the whole period of his engagement. It is hardly too much to say that the addition of 1000 men to the permanent force removes the opportunity of training 20,000 men for the Naval Reserve.

T. A. Brassey.

PART II.

BRITISH AND FOREIGN
ARMOURED AND UNARMOURED SHIPS.

PART II.

ALPHABETICAL LIST OF BRITISH AND FOREIGN ARMOURED AND UNARMOURED SHIPS.

The lists of ships were subjected to important modifications (ed. 1896). The order of the columns was rearranged so as to correspond in the British and Foreign Lists. A column was introduced for complements in place of that for coal endurance, and the place in the foreign lists where a ship is built was added. The calibre of all foreign guns is now given in inches.

As every nation is constantly rearranging the armament of individual ships it is only possible to publish the latest accessible information.

The vessels commonly known as Torpedo Catchers, which in the British Official *Navy Lists* are called First-Class Gunboats, and in the French Lists are known as Aviso Torpilleurs, are called in these lists Torpedo Gunboats. Torpedo-boats of all classes below Torpedo Gunboats are placed in a separate list.

Storeships, Harbour Service Ships, and Training Ships are not included in these lists.

The ships of those Powers whose Navies are of small importance will be found at the end of Part II.

The sketches of the ships are all drawn on the same scale (except in a few cases specially indicated), so that their relative sizes are apparent by inspection.

ABBREVIATIONS.

The following abbreviations are used throughout the Alphabetical List, occurring mainly in the first column, showing the class of ship, and in the armour column:—

- a.c. Armoured cruiser.
- a.g.b. Armoured gunboat.
- b. Barbette ship.
- br. Broadside ship.
- c.b. Central-battery ship.
- c.d.s. Coast-defence ship.
- c. Composite-built hull.
- comp. (in armour column). Compound or steel-faced armour.
- c.t. Conning-tower.
- shd. Sheathed.
- corv. Corvette.
- cr. Cruiser.
- d.v. Despatch vessel.
- g.b. Gunboat.
- g.v. Gun-vessel
- H.S. Harveyed steel (in armour column).
- I. Iron hull.
- S. Steel hull.
- 2 s. Twin screw.
- t. Turret-ship.
- t. Trial-speed (in speed column).
- to.cr. Torpedo-cruiser.
- to.g.b. Torpedo-gunboat.
- to.r. Torpedo-ram.
- w. Wooden hull.

Armament abbreviations. As breech-loading rifled guns are now the most numerous in all fleets, it must be understood that all guns are of that description, unless it be otherwise indicated.

- l. Light guns under 15 cwt., including boats' guns.
- M.L.R. Muzzle-loading rifled guns.
- Q.F. Quick or rapid-firing guns.
- f. tu. or b. tu. Fixed or bow tube for discharging Fish Torpedoes.
- sub. Submerged tube for do.

GREAT BRITAIN.—Armoured Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Completion.	Cost.	Armour. Side.	Armour. Bulk-head.	Armour. Gun Position	Armour. Backing. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coals that can be carried in Bunkers.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.					£	in.	in.	in.	in.			knots.	tons.	
a.c.	Achilles	I.	9820	380 0	58 3½	27 3	1	4000	Chatham	Penn	1864	444,546	4½	4½	4½	18–10	14 9-in. M.L.R., 2 6-pr., 8 3-pr. Q.F., 16 M., 2 l.	..	12·7	750	707
t. 2nd c.	Agamemnon	I.	8660	280 0	66 0	24 0	2	4500	Chatham	Penn	1883	504,065	18–15	16	16	18–9 3	4 12·5-in. M.L.R., 2 6-in., 6 6-pr. Q.F., 8 3-pr., 5 M., 2 l.	2	12·1	960	410
t. 2nd c	Ajax	I.	8660	280 0	66 0	24 0	2	4500	Pembroke	Penn	1883	518,357									
a.c.	Agincourt	I.	10,600	400 0	59 5	27 9	1	4000	Birkenh'd	Maudslay	1868	465,477	5½	4½	5½	10	17 9-in., M.L.R., 2 20-pr., 10 3-pr. Q.F., 7 M., 5 l.	2	12·0	750	687
h. 1st cl.	Albion	S.	12,950	390 0	74 0	25 5	2	13,500	Blackwall	Maudslay	..	..	8 H. S.	6 H. S.	12–5 H. S.	3–2	4 12-in., 12 6-in. Q.F., 18 smaller Q.F., 2 l.	5 (4 sub.)	18·75	1850	700
c.b. 2nd c.	Alexandra	I.	9490	325 0	63 8	26 6	2	7000	Chatham	Humphrys	1877	514,324	12	8–5	8	12–10 1½–1	8 10-in. M.L.R., 4 9·2-in., 6 4-in., 4 6-pr. Q.F., 6, 3-pr., 13 M., 3 l.	4	14·3	680	408
b. 1st cl	Anson	S.	10,600	330 0	68 6	27 3	2	11,500	Pembroke	Humphrys	1889	x 724,765	18 comp.	16 comp.	14–12 comp.	10–15 3–2½	4 13·5-in., 5 6-in., 12 6-pr. Q.F., 10 3-pr., 7 M., 2 l.	5	16·9	1200	515
c.b. 3rd c.	Audacious	I.	6010	280 0	54 0	23 8	2	3300	Glasgow	Ravenhill	1869	246,482	8	5	6	10	10 9-in. M.L.R., 8 4-in., 4 6-pr. Q.F., 6 3 pr., 6 M., 3 l.	4	11·6	500	492
a.c	Aurora	S.	5600	300 0	56 0	22 6	2	8500	Pembroke	Thomson	1889	x 284,550	10 comp.	16 comp.	4½	6 3–2	2 9·2-in., 10 6-in. Q.F., 6 6-pr., 10 3 pr., 6 M., 3 l.	2	18·0	900	481
a.c.	Australia	S.	5600	300 0	56 0	22 6	2	8500	Glasgow	Napier	1888	259,390						4			
b. 1st cl.	Barfleur	S shd.	10,500	360 0	70 0	25 6	2	13,163	Chatham	Greenock Foundry	1894	599,089	12 comp.	12 comp.	9	.. 2½–2	4 10-in., 10 4·7-in. Q.F., 8 6-pr., 12 3-pr., 7 M., 2 l.	7 (2 sub.)	18·5	1240	606
c.d.s. c.b.	Belleisle	I.	4870	245 0	52 0	21 0	2	2600	Poplar	Maudslay	1878	240,000 (purchas'd)	12	9	9	16–9 3–1	4 12-in. M.L.R., 6 6-pr. Q.F., 6 M., 2 l.	2	11·9	510	284
c.b. 3rd c.	Bellerophon	I.	7550	300 0	56 1	6 7	1	4000	Chatham	Penn	1866	322,701	6	5	6	10	10 8-in., 4 6-in., 6 4-in., 4 6-pr. Q.F., 12 M., 4 l.	2	12·4	650	572
b. 1st cl.	Benbow	S.	10,600	330 0	68 6	27 3	2	11,500	Blackwall	Maudslay	1888	760,820	18 comp.	16 comp.	14–2 comp.	12–15 3–2½	2 16·25-in., 10 6-in. Q.F., 10 3-pr., 7 M., 2 l.	5	16·75	1200	309
b. 1st cl.	Cæsar	S.	14,900	390 0	75 0	27 6	2	12,000	Portsm'th	Maudslay	Com.	865,533	9 H. S.	14–9 H. S.	14–6 H. S.	.. 4–2½	4 12-in., 12 6-in. Q.F., 18 12-pr., 12 3 pr., 8 M., 2 l.	5 (4 sub.)	17·5	1850	757
b. 1st cl.	Camperdown	S.	10,600	330 0	68 6	27 3	2	11,500	Portsm'th	Maudslay	1889	x 769,456	18 comp.	16 comp.	12 comp.	10–15 3–2½	4 13·5-in., 6 6-in., 12 6-pr. Q.F., 10 3-pr., 7 M., 2 l.	4	16·9	1200	515
b. 1st cl.	Canopus	S.	12,950	390 0	74 0	25 5	2	13,500	Portsm'th	Greenock Foundry	..	..	6 H. S.	12 H. S.	12–5 H. S.	3–2	4 12-in., 12 6-in. Q.F., 18 smaller Q.F., 2 l.	5 (4 sub.)	18·75	1850	700
b. 1st cl.	Centurion	S. shd.	10,500	360 0	70 0	25 6	2	13,214	Portsm'th	Greenock Foundry	1893	608,098	12 comp.	12 comp.	9 comp.	.. 2½–2	4 10-in., 10 4·7-in. Q.F., 8 6-pr., 12 3-pr., 7 M., 2 l.	7 (2 sub.)	18·51	1240	622
b. 1st cl.	Collingwood	S.	9500	325 0	68 0	26 10	2	9500	Pembroke	Humphrys	1886	624,000	18 comp.	16 comp.	12 comp.	17–10 2½	4 12-in., 6 6-in., Q.F., 12 6-pr. 8 3-pr., 6 M., 2 l.	4	16·50	1200	480
t. 2nd c.	Colossus	S.	·9420	325 0	68 0	26 3	2	5500	Portsm'th	Maudslay	1886	646,786	18–14 comp.	16–13 comp.	16 comp.	22–10 3–2½	4 12-in., 5 6-in., 4 6-pr. Q.F., 10 3-pr., 6 M., 4 l.	2	14·2	970	288
t. 3rd c.	Conqueror	S.	6200	270 0	58 0	24 0	2	6000	Chatham	Humphrys	1882	418,433	12–8½	11½	12	13 2½–1¾	2 12-in., 4 6-in., 6 6-pr. Q.F., 12 M., 2 l.	6	15·3	650	330
c.d.s. t.	Cyclops	I.	3560	225 0	45 0	16 4	2	1200	Blackwall	Elder	1871	154,026	8–6	9–8	9	11 1½	4 10-in. M.L.R., 4 3-pr. Q.F., 5 M., 1 l.	..	9.9	250	196
t. 2nd c.	Devastation	I.	9330	285 0	62 3	27 6	2	7000	Portsm'th	Maudslay	1873	353,848	12–10	12–10	14	18–16 3–2	4 10-in., 6 6-pr. Q.F., 8 3-pr., 5 M., 2 l.	2 (2 sub.)	14·0	1800	410
t. 2nd c.	Dreadnought	I.	10,820	320 0	63 10	26 9	2	6500	Pembroke	Humphrys	1875	592,573	14	13	14	18–15 3–2	4 12·5-in. M.L.R., 6 6-pr. Q.F., 12 3-pr., 7 M., 2 l.	2	13·7	1200	253
t. 2nd c.	Edinburgh	S.	9420	325 0	68 0	26 3	2	5500	Pembroke	Humphrys	1886	642,333	18–14 comp.	16–13 comp.	16 comp.	22–10 3–2½	4 12-in., 5 6-in., 4 6-pr. Q.F., 10 3-pr., 6 M., 2 l.	2	14·2	970	289
b. 1st cl.	Empress of India	S.	14,150	380 0	75 0	27 6	2	13,000	Pembroke	Humphrys	1893	838,087	18–5 comp.	16 comp.	17–6 comp.	.. 3	4 13·5-in., 10 6-in. Q.F., 16 6-pr., 12 3-pr., 8 M., 2 l.	7 (2 sub.)	17·5	1800	730
a.c.	Galatea	S.	5600	300 0	56 0	22 6	2	8500	Glasgow	Napier	1889	258,390	10 comp.	16 comp.	4½	6 3–2	2 9·2-in., 10 6-in. Q.F., 6 6-pr. 10 3-pr., 6 M., 3 l.	4	18·1	900	484

x Includes Hydraulic Machinery, Gun Mountings, &c.

GREAT BRITAIN.—Armoured Ships—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Completion.	Cost.	Armour. Side.	Armour. Bulk-head.	Armour. Gun Position	Armour. Backing. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coals that can be carried in Bunkers.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.					£	in.	in.	in.	in.			knots.	tons.	
c.d.s. t.	Glatton	I.	4910	245 0	54 0	19 5	2	2000	Chatham	Laird	1872	219,529	12–10	12	14	20 / 3–1½	2 11-in. M.L.R., 3 6-pr. Q.F., 4 M., 1 l.		11·0	540	192
b. 1st cl.	Glory	S.	12,950	390 0	74 0	25 5	2	13,500	Laird	Laird	..	..	6 H. S.	12 H. S.	12–5 H. S.	3·2	4 12-in., 12 6-in. Q.F., 18 smaller Q.F., 2 l.	5 (4 sub.)	18·75	1850	700
b. 1st cl.	Goliath	S.	12,950	390 0	74 0	25 5	2	13,500	Chatham	Penn	..	..									
c.d.s. t.	Gorgon	I.	3560	225 0	45 0	16 4	2	1200	Jarrow	Ravenhill	1872	138,567	8–6	9–8	10	11 / 1½	4 10-in. M.L.R., 4 3-pr. Q.F., 5 M. 2 l.	..	9·9	270	192
b. 1st cl.	Hannibal	S.	14,900	390 0	75 0	27 6	2	12,000	Pembroke	Harland	1897	867,403	9 H. S.	14–9 H. S.	14·6 H. S.	.. / 4–2½	4 12-in., 12 6-in. Q.F., 18 12-pr., 12 3-pr., 8 M., 2 l.	5 (4 sub.)	17·5	1850	757
c.d.s. t.	Hecate	I.	3560	225 0	45 0	16 4	2	1200	Poplar	Ravenhill	1872	140,593	8–6	9–8	10	11 / 1½	4 10-in. M.L.R., 4 3-pr. Q.F., 4 M., 1 l.	..	9·9	270	205
c.b. 3rd c.	Hercules	I.	8680	325 0	59 0½	26 6	1	8500	Chatham	Penn	1868	361,134	9–6	6–5	9	12–10	8 10-in. M.L.R., 2 9-in. do., 4 7-in. do., 6 4·7-in. Q.F., 9 6-pr., 13 3-pr., 7 M., 2 l.	4	14·6	610	408
t. 3rd c	Hero	S.	6200	270 0	58 0	24 0	2	6000	Chatham	Rennie	1888	397,271	12 comp.	11½ comp.	12 comp.	13½ / 2½–1¾	2 12-in., 4 6-in., 7 6-pr. Q.F., 5 3-pr., 6 M., 2 l.	6	15·2	620	330
t. 1st cl.	Hood	S.	14,150	380 0	75 0	27 6	2	13,000	Chatham	Humphrys	1893	830,536	18 comp.	17 comp.	18–6 comp.	.. / 3	4 13·5-in., 10 6-in. Q.F., 10 6-pr., 12 3-pr., 8 M., 2 l.	7 (2 sub.)	17·5	1800	730
c.d.s. t.	Hotspur	I.	4010	235 0	50 0	21 10	2	2500	Glasgow	Napier	1871	171,528	11 & 8	8	10–8½	15–10 / 2–1	2 12-in. M.L.R., 2 6-in., 8 12-pr., 4 3-pr. Q.F., 8 M., 2 l.	..	11·25	300	232
b. 1st cl.	Howe	S.	10,300	325 0	68 0	27 3	2	11,500	Pembroke	Humphrys	1889	667,022	18 comp.	16 comp.	11½ comp.	15–12 / 3–2½	4 13·5-in., 6 6-in. 5-ton, 12 6-pr. Q.F., 10 3-pr., 7 M., 2 l.	1	16·8	1200	515
c.d.s. t.	Hydra	I.	3560	225 0	45 0	16 4	2	1200	Glasgow	Elder	1872	141,372	8–6	9–8	9–10	11–9 / 1½	4 10-in. M.L.R., 4 3-pr. Q.F., 5 M., 2 l.	..	9·9	250	196
b. 1st cl.	Illustrious	S.	14,900	390 0	75 0	27 6	2	12,000	Chatham	Penn	Com.	885,945	9 H. S.	14–9 H. S.	14–6 H. S.	.. / 4–2½	4 12-in., 12 6-in. Q.F., 18 12-pr., 12 3-pr., 8 M., 2 l.	5 (4 sub.)	17·5	1850	757
a.c.	Immortalité	S.	5600	300 0	56 0	22 6	2	8500	Chatham	Earle	1889	278,500	10 comp.	16 comp.	4½	6 / 3–2	2 9·2-in., 10 6-in. Q.F., 6 6-pr., 10 3-pr., 6 M., 3 l.	2	18·0	900	484
a.c.	Impérieuse	S. shd.	8400	315 0	62 0	27 4	2	10,000	Portsm'th	Maudslay	1886	x 530,814	10 comp.	9 comp.	4½ comp.	10 / 4–2	4 9·2-in., 10 6-in. Q.F., 8 6-pr., 10 3-pr., 6 M., 2 l.	6	16·7	1130	544
t. 2nd c	Inflexible	I.	11,880	320 0	75 0	26 4	2	6500	Portsm'th	Elder	1881	795,268	24–16	22–14	17 comp.	17–25 / 3	4 16-in. M.L.R., 8 4-in., 4 6-pr. Q.F., 2 3-pr., 15 M., 2 l.	4 (2 sub.)	12·8	1300	485
c.b. 3rd c.	Invincible	I.	6010	280 0	54 0	23 2	2	3500	Glasgow	Napier	1870	239,441	8	5	6	10	10 9-in. M.L.R., 6 4-in., 15 M., 4 l.	4	12·5	500	492
c.b. 3rd c.	Iron Duke	I.	6010	280 0	54 0	23 3	2	3500	Pembroke	Ravenhill	1871	196,479	8	5	6	10	10 9-in. M.L.R., 4 5-in., 4 20-pr., 14 M., 4 l.	4	12·5	500	492
b 1st cl.	Jupiter	S.	14,900	390 0	75 0	27 6	2	12,000	Clydeb'nk	Thomson	Com.	893,816									
b 1st cl.	Magnificent	S.	14,900	390 0	75 0	27 6	2	12,000	Chatham	Penn	1895	912,291									
b 1st cl.	Majestic	S.	14,900	390 0	75 0	27 6	2	12,000	Portsm'th	Barrow	1895	910,632	9 H. S.	14–9 H. S.	14–6 H. S.	.. / 4–2½	4 12-in., 12 6-in. Q.F., 18 12-pr., 12 3-pr., 8 M.	5 (4 sub.)	17·5	1850	757
b 1st cl.	Mars	S.	14,900	390 0	75 0	27 6	2	12,000	Birkenh'd	Laird	Com.	894,330									
a.c.	Minotaur	I.	10,690	400 0	59 4¾	27 3	1	4000	Blackwall	Penn	1867	456,830	5½	4½	5½	10	17 9-in. M.L.R., 4 4·7-in. Q.F., 8 3-pr. 8 M., 3 l.	2	12·0	750	701
t. 3rd c.	Monarch	I.	8930	330 0	57 6	26 7	1	8216	Chatham	Maudslay	1869	354,575	7–6	5–4½	8	12	4 12-in. M.L.R., 2 9-in. do., 1 7-in. do., 4 12-pr. Q.F., 10 3-pr., 6 M., 2 l.	2	15	630	598
a.c.	Narcissus	S.	5600	300 0	56 0	22 6	2	8500	Hull	Earle	1889	257,390	10 comp.	16 comp.	4½	6 / 3–2	2 9·2-in., 10 6-in. Q.F., 6 6-pr., 10 3-pr., 6 M., 3 l.	4	18·1	900	484
a.c.	Nelson	I. shd.	7630	280 0	60 0	26 6	2	5500	Glasgow	Elder	1880	390,855	9–6	9–6	6	13–10 / 3–2	4 10-in. M.L.R., 8 9-in. do., 4 4·7-in. Q.F., 6 6-pr., 14 3-pr., 7 M., 3 l.	2	13·6	1150	580

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GREAT BRITAIN.—Armoured Ships—*continued.*

Class	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Maximum Draught.		Propellers.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Completion.	Cost.	Armour.				Armament.		Speed.	Coals that can be carried in Bunkers.	Complement.
																Side.	Bulk-head.	Gun Position.	Backing. Deck Plating.	Guns.	Torpedo Tubes.			
			tons.	ft.	in.	ft.	in.	ft.	in.	no.					£	in.	in.	in.	in.			knots.	tons.	
a.c.	Northampton	I. shd.	7630	280	0	60	0	25	9	2	4500	Glasgow	Penn	1878	395,804	9–6	9–6	6	13–10 3–2	4 10-in. M.L.R., 8 9-in. do., 4 4·7-in. Q.F., 8 3-pr., 10 M., 3 l.	2	12·6	1150	580
t. 2nd c.	Neptune	I. shd.	9310	300	0	63	0	26	1	1	6000	Poplar	Penn	1878	600,000 (purchas'd)	12–9	8–6	11–13	11–13 3–2	4 12·5-in. M.L.R., 2 9-in. do., 6 6-pr. Q.F., 8 3-pr., 11 M., 2 l.	2	13·4	670	412
t. 1st cl.	Nile	S.	11,940	345	0	73	0	27	6	2	12,000	Pembroke	Maudslay	1890	819,717	20–16 *comp.*	18–14 *comp.*	18 *comp.*	6 3	4 13·5-in., 6 4·7-in. Q.F., 8 6-pr., 12 3-pr., 7 M., 3 l.	6 (2 sub.)	16·7	1200	558
a.c.	Northumberland	I.	10,780	400	4	59	5	27	1	1	4381	Millwall	Penn	1868	471,352	5½	4½	5½	10	7 9-in. M.L.R., 20 8-in. do., 1 6-in., 1 5-in., 6 4·7-in. Q.F., 10 3-pr., 6 M., 5 l.	..	13·3	756	701
b. 1st cl.	Ocean	S.	12,950	390	0	74	0	25	5	2	13,500	Devonport	Hawthorn	..	..	6 H. S.	12 H. S.	12–5 H. S.	3–2	4 12-in., 12 6-in. Q.F., 18 smaller Q.F., 2 l.	5 (4 sub.)	18·75	1850	700
c.d.s.	Orion	I.	4870	245	0	52	0	21	4	2	2600	Poplar	Maudslay	1882	292,229	12–7	9–5	8	16–9 3–1	4 12-in. M.L.R., 6 6-pr. Q.F., 6 M., 2 l.	4	11·9	520	284
a.c.	Orlando	S.	5600	300	0	56	0	22	6	2	8500	Jarrow	Palmer	1888	266,812	10 *comp.*	16 *comp.*	4½ *comp.*	6 3–2	2 9·2in., 10 6-in., 6 6-pr. Q.F., 10 3-pr., 7 M., 3 l.	2	18·1	900	484
c.d.s. c.b.	Penelope	I.	4470	260	0	50	0	17	6	2	2700	Pembroke	Maudslay	1868	186,848	6–5	4½	5	10–11	8 9-ton M.L.R., 4 3-pr. Q.F., 11 M., 4 l.	..	11·0	470	265
c.d.s. t.	Prince Albert	I.	3880	240	0	48	1	20	4	1	1300	Poplar	Humphrys	1866	202,666	4½	5	4½	18 ¾	4 12-ton M.L.R., 6 M., 2 l.	..	9·7	230	205
b. 1st cl.	Prince George	S.	14,900	390	0	75	0	27	6	2	12,000	Portsm'th	Humphrys	1896	885,037	9 H. S.	14–9 H. S.	14–6 H. S.	.. 4–2½	4 12-in., 12 6-in. Q.F., 18 12-pr., 12 3-pr., 2 l.	5 (4 sub.)	17·5	1850	757
b. 1st cl.	Renown	S. shd.	12,350	380	0	72	0	26	9	2	12,000	Pembroke	Maudslay	1896	696,425	8–6 H. S.	10–6 H. S.	10 H. S.	.. 3–2	4 10-in. 29-ton, 10 6-in. Q.F., 14 12-pr., 12 3-pr., 7 M., 2 l.	5 (2 sub.)	18·0	1800	674
b. 1st cl.	Ramillies	S.	14,150	380	0	75	0	27	6	2	13,000	Glasgow	Thomson	1893	874,255									
b. 1st cl.	Repulse	S.	14,150	380	0	75	0	27	6	2	13,000	Pembroke	Humphrys	1894	841,274									
b. 1st cl.	Resolution	S.	14,150	380	0	75	0	27	6	2	13,000	Jarrow	Palmer	1893	852,755	18–5 *comp.*	16 *comp.*	17 *comp.*	.. 3	4 13·5in., 10 6-in. Q.F., 16 6-pr., 12 3-pr., 8 M., 2 l.	7 (2 sub.)	17·5	1800	730
b. 1st cl.	Revenge	S.	14,150	380	0	75	0	27	6	2	13,000	Jarrow	Palmer	1895	852,755									
b. 1st cl.	Royal Oak	S.	14,150	380	0	75	0	27	6	2	13,000	Birkenh'd	Laird	1894	877,378									
b. 1st cl.	Royal Sovereign	S.	14,150	380	0	75	0	27	6	2	13,312	Portsm'th	Humphrys	1892	824,583									
b. 1st cl.	Rodney	S.	10,300	325	0	68	0	27	3	2	11,500	Chatham	Humphrys	1888	669,278	18 *comp.*	16 *comp.*	11 *comp.*	15–12 3–2½	4 13·5 in., 6 6-in. Q.F., 12 6-pr., 10 3-pr., 6 M., 2 l.	4	16·75	1200	515
c.d.s. t.	Rupert	I.	5440	250	0	53	0	23	7	2	6000	Chatham	Portsm'th	1874	232,677	11–9	12	14–12	14–10 3–2	2 9·2-in., 2 6-in., 4 6-pr. Q.F., 6 3-pr., 2 M., 2 l.	4	14·0	480	293
t. 1st cl.	Sans Pareil	I.	10,470	340	0	70	0	27	3	2	14,000	Blackwall	Humphrys	1889	*x* 719,442	16–18 *comp.*	16 *comp.*	18 *comp.*	6 3	2 16·25in., 1 10-in., 12 6-in. Q.F., 12 6-pr. 12 3-pr., 8 M., 2 l.	6 (2 sub.)	17·2	1200	583
c.d.s.	Scorpion	I.	2750	224	6	42	4½	16	11	1	1000	Birkenh'd	Laird	1865	110,573	4½	..	5	10–8	4 9-in. M.L.R., 6 M., 1 l.	..	8·5	320	151
t. a.c.	Shannon	I. shd.	5390	260	0	54	0	23	4	1	2500	Pembroke	Laird	1877	287,169	9–6	9–8	9	10–12 3–1	2 10-in. M.L.R., 7 9-in. do., 6 20-pr., 11 M., 8 l.	2	11·2	580	156
c.b. 3rd c.	Sultan	I.	9290	325	0	59	0½	27	6	1	8000	Chatham	Thomson	1871	357,415	9–6	6–4½	9–8	12–10	8 10 in. M.L.R., 4 9-in. do., 4 4·7-in. Q.F., 9 6-pr., 13 3-pr., 7 M., 2 l.	4	14·0	810	661
c.b. 2nd c.	Superb	I.	9170	332	3	59	0	26	5	1	8500	Blackwall	Maudslay	1880	443,000 (purchas'd)	12–10	10–5	10	7–12 1½	16 10-in. M.L.R., 6 4-in., 6 6-pr. Q.F., 10 3-pr., 6 M., 3 l.	4	15·0	970	654
c.b. 3rd c.	Swiftsure	I. shd.	6910	280	0	55	0	26	0	1	3500	Jarrow	Maudslay	1872	257,081	8–6	6–4	6	10	10 9-in. M.L.R., 8 4-in., 4 3-pr. Q.F., 12 M., 3 l.	4	12·6	540	497
c.b. & b. 2nd c.	Temeraire	I. shd.	8540	285	0	62	0	27	2	2	6500	Chatham	Humphrys	1877	454,969	11–8	8–5	10–8	12–10 1½–1	4 11-in. M.L.R., 4 10-in. do., 6 4-in., 4 6-pr. Q.F., 10 3-pr., 8 M., 4 l.	2	13·8	620	592

x Includes Hydraulic Machinery, Gun Mountings, &c.

GREAT BRITAIN.—Armoured Ships—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Maximum Draught.		Propellers.	Indicated Horse-Power	Where Built.	Maker of Engines.	Date of Completion.	Cost.	Armour.				Armament.		Speed.	Coals that can be carried in Bunkers.	Complement.
																Side.	Bulk-head.	Gun Position	Backing. Deck Plating.	Guns.	Torpedo Tubes.			
			tons.	ft.	in.	ft.	in.	ft.	in.	no.					£	in.	in.	in.	in.			knots.	tons.	
t. 2nd c.	Thunderer .	I.	9330	285	0	62	3	27	0	2	7000	Pembroke	Maudslay	1877	358,542	12–10	12–10	14–12	18–16 3–2	4 10-in., 6 6-pr. Q.F., 8 3-pr., 4 M., 2 l.	2	14·0	1600	410
t. 1st cl.	Trafalgar .	S.	11,940	345	0	73	0	27	6	2	12,000	Portsm'th	Humphrys	1890	*x* 862,794	20–16 *comp.*	18–14 *comp.*	18 *comp.*	6 3	4 13·5 in., 6 6-in. Q.F., 8 6-pr., 12 3-pr., 6 M., 3 l.	6 (2 sub.)	16·7	1200	572
c.b. 3rd c.	Triumph .	I. shd.	6640	280	0	55	0	26	2	1	3500	Jarrow	Maudslay	1873	258,322	8–6	6–4	6	10	10 9-in. M.L.R., 4 5-in., 8 6-pr. Q.F., 8 3-pr., 5 M., 3 l.	4	12·6	550	497
a.c.	Undaunted .	S.	5600	300	0	56	0	22	6	2	8500	Jarrow .	Palmer .	1889	256,055	10 *comp.*	16 *comp.*	4½ *comp.*	6 3–2	2 9·2-in., 10 6-in., 6 6-pr. Q.F., 10 3-pr., 7 M., 3 l.	4	18·1	900	484
b. 1st cl.	Victorious .	S.	14,900	390	0	75	0	27	6	2	12,000	Chatham	Hawthorn	Com.	868,313	9 H. S.	14–9 H. S.	14–6 H. S.	.. 4–2½	4 12-in., 12 6-in. Q.F., 18 12-pr., 12 3-pr., 8 M., 2 l.	5 (4 sub.)	17·5	1850‡	757
a.c.	Warspite .	S.	8400	315	0	62	0	27	4	2	10,000	Chatham	Penn .	1888	529,332	10 *comp.*	9 *comp.*	8 *comp.*	10 3–2	4 9·2-in., 10 6-in. Q.F., 4 6-pr. Q.F., 9 3-pr., 6 M., 2 l.	6	16·7	1130	535
c.d.s. *t.*	Wivern .	I.	2750	224	6	42	4	17	0	1	1000	Birkenh'd	Laird .	1865	116,514	4½	..	5	8–10	4 9-in. M.L.R., 8 M., 1 l.	..	8·5	300	151
t. 1st.cl.	4 Canopus class .		Design not settled.											Pro.										
	The following, which appear in the Official Navy List, are lent to India and Australia:—																							
c.d.s. *t.*	Abyssinia* (*Indian Marine.*)	I.	2900	225	0	42	0	14	6 6	2	900	Poplar	Dudgeon	1870	116,549	7–6	8–7	10–8	11–9 1½–1	4 8-in. 14-ton, 7 M., 2 l.	..	9·0	92	193
c.d.s. *t.*	Cerberus† (*Victorian Marine.*)	I.	3480	225	0	45	0	15	3	2	1660	Jarrow	Maudslay	1870	117,556	8–6	9–8	10–9	11–9 1½–1	4 10-in. 18-ton M.L.R., 4 M.	..	9·75	120	196
c.d.s. *t.*	Magdala*. (*Indian Marine.*)	I.	3340	225	0	45	0	15	3	2	1400	Blackwall	Ravenhill	1870	132,400	8–6	9–8	10–9	11–9 1½–1	4 8-in. 14-ton, 7 M., 2 l.	..	10·0	120	194

* At Bombay. † At Melbourne. ‡ Bunker capacity.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.					£	in.	in.			knots.	tons.	
Sloop .	Acorn . .	C.	970	167 0	32 0	14 0	1	1200	Milford Haven	Maudslay.	1884	42,000	..	..	8 5-in. 38-cwt., 8 M., 1 l.	..	12·2	150	126
2nd cl. Cr.	Active . .	I. shd.	3080	270 0	42 0	21 4	1	2100	Blackwall	Humphrys	1869	126,156	..	..	10 6-in., 2 64-pr. M.L.R., 9 M., 2 l.	..	15·10	410	339
" "	Æolus . .	S. shd.	3600	300 0	43 0	17 6	2	9000	Devonp'rt	Hawthorn.	1892	208,450	4½	2-1	2 6-in. Q.F., 6 4·7-in. 8 6-pr. 1 3-pr., 4 M., 1 l.	4	19·75	400	273
Dsp. Ves.	Alacrity .	S.	1700	250 0	32 6	14 0	2	3000	Jarrow .	Palmer .	1885	77,969	..	..	10 6-pr. Q.F., 2 M. .	..	17·00	400	114
T. G. B. .	Alarm . .	S.	810	230 0	27 0	8 9	2	3884	Sheerness	Penn .	1892	59,346	4½	..	2 4·7-in. Q.F., 4 3-pr. do.	3	19·25	100	91
2nd cl. G. B.	Albacore .	C.	560	135 0	26 0	10 6	1	500	Birkenh'd	Laird .	1883	28,556	..	..	2 5-in., 2 4-in., 2 M. .	..	11·0	85	59
Sloop .	Alert . .	S. shd.	960	180 0	32 6	11 6	1	1400	Sheerness	Sheerness .	1894	60,309	..	..	6 4-in. 25-pr. Q.F., 4 3-pr., 2 M.	..	13·25	130	101
" .	Algerine .	S.	1050	185 0	32 6	11 3	2	1400	Devonp'rt	Devonport.	1895	63,904	·22	..	6 4-in. 25-pr. Q.F., 4 3-pr., 3 M.	..	13·0	160	106
2nd cl. Cr.	Amphion .	S.	4300	300 0	46 0	20 6	2	5000	Pembroke	Maudslay .	1883	160,500	..	1½	10 6-in. Q.F., 4 3-pr., 10 M., 2 l.	4	16·6	1000*	309
" "	Andromache	S.	3400	300 0	43 0	16 6	2	9000	Chatham.	Earle .	1890	186,280	4½	2-1	2 6-in. Q.F., 6 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1l.	4	20·0	400	273
" "	Apollo .	S.	3400	300 0	43 0	16 6	2	9000	Chatham.	Earle .	1891	186,361							
1st cl. Cr.	Andromeda .	S.	11,000	435 0	69 0	26 0	2	16,500	Pembroke	Hawthorn.	1897	..	4½	3-6	16 6-in., 14 12-pr., 12 3-pr., 2 12-pr. boat.	3 (2 sub.)	20·0	1000	600
T. G. B. .	Antelope .	S.	810	230 0	27 0	8 9	2	3621	Devonp'rt	Yarrow .	1893	61,397	4½	..	2 4·7-in. Q.F., 4 3-pr. .	3	19·25	100	91
3rd cl. Cr.	Archer . .	S.	1770	225 0	36 0	14 6	2	3500	Glasgow .	Thomson .	1885	x87,583	..	..	6 6-in. 8 3-pr. Q.F., 2 M., 1 l.	3	16 5	475	172

x Includes Gun Mountings, &c. * Bunker capacity.

GREAT BRITAIN.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed	Normal Coal Supply.	Complement.
			tons.	ft. in	ft. in.	ft. in.	no.					£	in.	in.			knots.	tons.	
1st cl. Cr.	Argonaut .	S.	11,000	435 0	69 0	26 0	2	16,500	Fairfield .	..	Bldg.	..							
,, ,,	Ariadne .	S.	11,000	435 0	69 0	26 0	2	16,500	Clydeb'nk	..	Bldg.	..	4½	3–6	16 6-in. Q.F., 14 12-pr., 12 3-pr., 2 12-pr. boat.	3 (2 sub.)	20·5	1000	600
,, ,,	Amphit·ite	S.	11,000	435 0	69 0	26 0	2	16,500	Barrow .	..	Bldg.	..							
2nd cl. Cr.	Arethusa .	S.	4300	300 0	46 0	20 6		5000	Glasgow .	Napier	1882	145,198		1½	10 6-in., 8 3-pr. Q.F., 6 M., 2 l.	4	16·6	1000†	309
,, ,,	Arrogant .	S.	5750	320 0	57 6	22 0	2	10,000	Devonp'rt	Earle	1896	..	4½	1–2 N. S.	4 6-in., Q.F., 6 4·7-in., 9 12-pr., 3 3-pr., 1 12-pr. boat, 5 M.	2	19·5	500	450
,, ,,	Astræa .	S. shd.	4360	320 0	49 6	19 0	2	9112	Devonp'rt	Devonport	1893	244,831	4½	2–1	2 6-in. Q.F., 8 4·7-in., 8 6-pr. 1 3-pr., 4 M., 1 l.	4	19·75	400	312
3rd cl. Cr.	Barham* .	S.	1830	280 0	35 0	13 3	2	4700	Portsm'th	Hawthorn .	1889	113,302	4½	2–1	6 4·7-in. Q.F., 4 3-pr., 2 M.	2	18·6	140	169
,, ,,	Bellona .	S.	1830	280 0	35 0	13 3	2	4700	Newcastle	Hawthorn .	1890	94,195	4½	2–1	6 4·7-in. Q.F., 4 3-pr., 2 M.	2	17·8	140	169
,, ,,	Barracouta	S.	1580	220 0	35 0	14 0	2	3000	Sheerness	Palmer	1889	96,315	4½	2–1	6 4·7-in. Q.F., 4 3-pr., 2 M.	2	16·5	160	159
,, ,,	Barrosa .	S.	1580	220 0	35 0	14 0	2	3000	Portsm'th	Palmer	1889	79,238	4½	2–1	6 4·7-in. Q.F., 4 3-pr., 3 M.	2	16·5	160	159
,, ,,	Blanche .	S. shd.	1580	220 0	35 0	14 0	2	3000	Pembroke	Earle	1889	91,112	4½	2–1	6 4·7-in. Q.F., 4 3-pr., 2 M.	2	16·5	160	159
,, ,,	Blonde .	S. shd.	1580	220 0	35 0	14 0	2	3000	Pembroke	Earle	1889	90,059	4½	2–1	6 4·7-in. Q.F., 4 3-pr., 2 M.	2	16 5	160	159
Sloop	Basilisk .	S. shd.	1170	195 0	28 0	12 6	2	2000	Sheerness	Rennie	1889	58,013							
,,	Beagle .	S. shd.	1170	195 0	28 0	12 6	2	2000	Portsm'th	Rennie	1889	56,474	..	..	8 5-in., 8 M.	..	14·7	160	138
1st cl. Cr.	Blake .	S.	9000	375 0	65 0	25 9	2	20,000	Chatham .	Maudslay .	1889	440,471	6	6–3	2 9·2-in., 10 6-in. Q.F., 16 3-pr Q.F., 7 M., 2 l.	4 (2 sub.)	21·5	1500	570
,, ,,	Blenheim	S.	9000	375 0	65 0	25 9	2	21,411	Blackwall	Humphrys	1890	425,591							
2nd cl. Cr.	Bonaventure	S. shd.	4360	320 0	49 6	19 0	2	9000	Devonp'rt	Hawthorn.	1892	247,128	4½	2–1	2 6-in. Q.F., 8 4·7-in., 8 6-pr., 1 3-pr. 4 M., 1 l.	4	19·5	400	312
T. G. B. .	Boomerang (Australia)	S.	735	230 0	27 0	8 3	2	3500	Elswick .	Bellis	1889	49,962	4½	..	2 4·7-in. Q.F., 4 3-pr., 1 M.	3	20·0	100	91
2nd cl. Cr.	Brilliant .	S. shd.	3600	300 0	43 8	17 6	2	9164	Sheerness	Hawthorn.	1891	204,228	4½	2–1	2 6-in. Q.F., 6 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	19·7	400	273
3rd cl. Cr.	Brisk. .	S.	1770	225 0	36 0	14 3½	2	3500	Glasgow	Thomson .	1886	87,583	..	..	6 6-in., 8 3-pr., Q.F., 2 M., 1 l.	3	16·5	325	172
Sloop .	Buzzard .	C.	1140	195 0	28 0	11 6	2	2000	Sheerness	Barrow	1887	58,700	..	..	8 5-in., 8 M.	2	14·50	160	138
3rd cl. Cr.	Calliope .	S. shd.	2770	235 0	44 6	19 11	1	4020	Portsm'th	Rennie	1884	120,000	..	1½	4 6-in., 12 5-in. 38 cwt., 10 M., 2 l.	2	14·6	550	293
,, ,,	Calypso .	d.	2770	235 0	44 6	19 11	1	4000	Chatham	Rennie	1883	119,500							
2nd cl. Cr.	Cambrian	shd.	4360	320 0	49 6	19 0	2	9000	Pembroke	Hawthorn.	1893	236,919	4½	2–1	2 6-in. Q.F., 8 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	19·5	400	312
3rd cl. Cr.	Carysfort .	S. shd.	2380	225 0	44 6	19 3	1	2000	Glasgow .	Elder	1878	114,454	..	1½	2 90-cwt. M.L.R., 12 64-pr. do., 6 M., 2 l.	2	12·75	470	265
,, ,,	Champion	S. shd.	2380	225 0	44 6	19 3	1	2000	Glasgow .	Elder	1878	113,983	..	1½	4 6-in., 8 5-in., 4 3-pr., Q.F., 6 M., 2 l.	2	12·75	470	265

* Being fitted with Thornycroft W. T. boilers.

† Bunker capacity.

GREAT BRITAIN.—Cruising Ships, &c.—*continued.*

Class.	NAME	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.					£	in.	in.			knots.	tons.	
3rd cl. Cr.	Cleopatra	S. shd.	2380	225 0	44 6	19 3	1	2000	Glasgow	Humphrys	1878	113,924	..	1½	4 6-in., 8 5-in., 4 3-pr. Q.F., 6 M., 2 l.	2	13·0	470	265
" "	Comus	S. shd.	2380	225 0	44 6	19 3	1	2000	Glasgow	Elder	1878	113,974	..	1½	10 6-in., 8 M., 2 l.	2	12·75	470	265
" "	Conquest	S. shd.	2380	225 0	44 6	19 3	1	2000	Glasgow	Humphrys	1878	110,912	..	1½	9 6-in., 8 M., 2 l.	2	13·0	470	265
" "	Constance	S. shd.	2380	225 0	44 6	19 3	1	2000	Chatham	Penn	1880	110,000	..	1½	2 90-cwt. M.L.R., 12 64-pr., 6 M., 2 l.	2	13·0	470	265
" "	Cordelia	S. shd.	2380	225 0	44 6	19 3	1	2000	Portsm'th	Rennie	1881	104,500	..	1½	10 6-in., 10 M., 2 l.	2	12·75	470	265
2nd cl. Cr.	Charybdis	S. shd.	4360	320 0	49 6	19 0	2	9000	Sheerness	Earle	1893	237,344	4½	2–1	2 6-in. Q.F., 8 4·7-in, 8 6-pr., 1 3-pr., 4 M., 1 l.	4	19·5	400	312
T. G. B.	Circe	S.	810	230 0	27 0	8 9	2	3500	Sheerness	Penn	1892	61,979	4½	..	2 4·7-in. Q.F., 4 3-pdr.	3	19·25	100	91
2nd cl. G. B.	Cockchafer	C.	465	125 0	23 6	9 6	1	360	Pembroke	Maudslay	1881	77,000	..	..	2 64-pr. M.L.R., 2 20-pr., 2 M.	..	9·8	40	61
3rd cl. Cr.	Cossack	S.	1770	225 0	36 0	14 3½	2	3500	Glasgow	Thomson	1886	x 87,583	..	..	6 6-in., 8 3-pr. Q.F., 2 M., 1 l.	3	16·5	325	172
1st cl. Cr.	Crescent	S. shd.	7700	360 0	60 0	23 9	2	12,000	Portsm'th	Penn	1892	383,068	6	5–1	1 9·2-in., 12 6-in. Q.F., 12 6-pr., 5 3-pr., 7 M., 2 l.	4 (2 sub.)	19·7	850	560
3rd cl. Cr.	Curaçoa	S. shd.	2380	225 0	44 6	19 3	1	2000	Glasgow	Humphrys	1878	112,931	..	1½	4 6-in., 8 5-in., 1 3-pr. Q.F., 9 M., 2 l.	2	13·0	470	265
1st cl. Gun Ves.	Curlew	S.	950	195 0	28 0	10 6	2	1200	Devonp'rt	Penn	1885	x 49,963	..	..	1 6-in. 3 5-in., 7 M.	1	14·5	250	103
Sloop	Daphne	C.	1140	195 0	28 0	11 6	2	2000	Sheerness	Greenock F'ndry Co.	1888	x 57,600	..	..	8 5-in., 8 M.	..	14·0	160	138
1st cl. Cr.	Diadem	S. shd.	11,000	435 0	69 0	26 0	2	16,500	Govan	Fairfield	1896	..	4½	3–6	16 6-in. Q.F., 14 12-pr., 12 3-pr., 2 12-pr. boat	3 (2 sub.)	20·5	1000	600
2nd cl. Cr.	Diana	S. shd.	5600	350 0	54 0	21 0	2	9600	Govan	Fairfield	1895	249,332							
" "	Dido	S.	5600	350 0	54 0	21 0	2	9600	Glasgow	London and Glasgow Co.	1896	252,278	4½	2½	5 6-in. Q.F., 6 4·7-in., 9 12-pr., 1 3-pr., 4 M., 1 12-pr. boat.	3 (2 sub.)	19·5	550	450
" "	Doris	S. shd.	5600	350 0	54 0	21 0	2	9600	Barrow	Barrow	1896	254,029							
Sloop	Dolphin	C.	925	157 0	32 0	14 0	1	750	Middl'sbro	Hawthorn	1882	x 35,650	4½	..	2 6-in., 2 5-in., 3 M., 2 l.	..	11·3*	135	115
T. G. B.	Dryad	S.	1070	250 0	30 6	9 0	2	3500	Chatham	Maudslay	1893	73,491	4½	..	2 4·7-in. Q.F., 4 6-pr.	3	19·0	100	120
2nd cl. Cr.	Eclipse	S. shd.	5600	350 0	53 0	20 3	2	9600	Portsm'th	Portsm'th	1894	279,345	4½	1½–3	5 6-in. Q.F., 6 4·7-in., 9 12-pr., 1 3-pr., 4 M., 1 12-pr. boat.	(2 sub.)	19·5*	550	437
1st cl. Cr.	Edgar	S.	7350	360 0	60 0	23 9	2	12,000	Devonp'rt	Elder	1890	401,083	6	5–1	2 9·2-in., 10 6-in. Q.F., 12 6-pr., 5 3-pr., 7 M., 2 l.	4 (2 sub.)	20·5	850	544
" "	Endymion	S.	7350	360 0	60 0	23 9	2	12,000	Hull	Earle	1891	350,459							
Sloop	Egeria	C.	940	160 0	31 4	14 3	1	700	Pembroke	Humphrys	1873	42,882	..	..	4 20-pr., 2 M., 1 l.	..	11·3	100	122
1st cl. Cr.	Europa	S. shd.	11,000	435 0	69 0	26 0	2	16,500	Clydeb'nk	Thomson	1897	..	4½	4	16 6-in. Q.F., 14 12-pr., 12 3-pr., 7 M.	3 (2 sub.)	20·5	1000	600
3rd cl. Cr.	Fearless	S.	1580	220 0	34 3	14 6	2	3200	Barrow	Barrow	1886	x 87,452	..	..	4 5-in., 8 3-pr. Q.F., 2 M., 1 l.	3 (1 sub.)	16·7	450	147
2nd cl. G. B.	Firebrand	C.	455	125 0	23 6	10 0	1	360	Glasgow	Thomson	1877	22,800	..	..	2 5-in., 2 4-in., 2 M.	..	10·17	40	61
2nd cl. Cr.	Flora	S. shd.	4360	320 0	49 6	19 0	2	9000	Pembroke	Barrow	1893	241,819							
" "	Forte	S. shd.	4360	320 0	49 6	19 0	2	9000	Chatham	Chatham	1893	240,816	4½	2–1	2 6-in. Q.F., 8 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	19·5	400	312
" "	Fox	S. shd.	4360	320 0	49 6	19 0	2	9000	Portsm'th	Portsm'th	1893	244,078							
" "	Forth	S.	4050	300 0	46 0	20 0	2	5700	Pembroke	Hawthorn	1886	201,952	4	3–2	2 8-in., 10 6-in., 3 6-pr. Q.F., 8 3-pr., 6 M., 2 l.	2	16·8	900	326
" "	Furious	S. shd.	5750	320 0	57 6	22 0	2	10,000	Devonp'rt	Earle	1886	..							
" "	Gladiator	S. shd.	5750	320 0	57 6	22 0	2	10,100	Portsm'th	Maudslay	1896	..	4½	1–2	4 6-in. Q.F., 6 4·7 in., 8 12-pr., 3 3-pr., 1 12-pr. boat, 5 M.	2	19·0	500	450

x Includes Gun Mountings, &c. * Eclipse, Diana, Doris: trial, 20·1 knots.

GREAT BRITAIN.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. T'pedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.					£	in.	in.			knots.	tons.	
1st cl. Cr.	Gibraltar	S. shd.	7700	360 0	60 0	23 9	2	12,000	Glasgow	Napier	1892	347,634	6	5–1	2 9·2-in., 10 6-in. Q.F. 12 6-pr., 5 3-pr., 7 M., 2 l.	4 (2 sub.)	19·7	850	544
T. G. B.	Gleaner	S.	735	230 0	27 0	8 3	2	3600	Sheerness	Sheerness	1890	63,798	4½	..	2 4·7-in. Q.F., 4 3-pr.	3	19·0	100	91
"	Gossamer	S.	735	230 0	27 0	8 3	2	3600	Sheerness	Sheerness	1890	54,490							
1st cl. G. B.	Goldfinch	C.	805	165 0	31 0	11 7½	1	1200	Sheerness	Sheerness	1889	40,889	..	..	6 4-in., 2 3-pr. Q.F., 2 M.	..	13·0	105	76
1st cl. Cr.	Grafton	S.	7350	360 0	60 0	23 9	2	12,000	Blackwall	Humphrys	1892	351,851	6	5–1	2 9·2-in., 10 6-in. Q.F., 12 6-pr., 5 3-pr., 7 M., 2 l.	4 (2 sub.)	20·0	850	544
T. G. B.	Grasshopper	S.	525	200 0	23 0	8 9	2	2700	Sheerness	Maudslay	1887	x 34,065	..	..	1 4-in., 6 3-pr. Q.F.	4	17·0	80	67
" "	Halcyon	S.	1070	250 0	30 6	9 0	2	3500	Devonp'rt	Hawthorn	1894	75,091							
" "	Harrier	S.	1070	250 0	30 6	9 0	2	3500	Devonp'rt	Hawthorn	1894	73,428	4½		2 4·7-in. Q.F., 4 6-pr.	3	19·0	100	120
1st cl. Cr.	Hawke	S.	7350	360 0	60 0	23 9	2	12,000	Chatham	Elder	1891	365,491	6	5–1	2 9·2-in., 10 6-in. Q.F., 12 6-pr., 5 3-pr., 7 M., 2 l.	4 (2 sub.)	20·0	850	544
T. G. B.	Hazard	S.	1070	250 0	30 6	9 0	2	3500	Pembroke	Elder	1894	74,076	4½		2 4·7-in. Q.F., 4 6-pr.	3	19·0	100	120
" "	Hebe	S.	810	230 0	27 0	8 9	2	3566	Sheerness	Sheerness	1892	73,433	4½		2 4·7-in. Q.F., 4 3-pr.	3	19·25	100	91
T. D. S.	Hecla	I.	6400	391 7	38 9	24 3	1	2400	Belfast	Harland & Wolff	1878	126,190	..		4 64-pr. M.L.R., 1 5-in., 1 40-pr., 14 M.	4	13·0	2,200	277
2nd cl. Cr.	Hermes	S.	5650	350 0	54 0	21 0	2	10,000	Glasgow	Fairfield	Bldg.	..							
" "	Highflyer	S.	5650	350 0	54 0	21 0	2	10,000	"	"	Bldg.	..	4½	1½–3	11 6-in. Q.F., 15 smaller Q.F.	..	20.0	550	437
" "	Hyacinth	S.	5650	350 0	54 0	21 0	2	10,000	"	London and Glasgow Co.	Bldg.	..							
" "	Hermione	S. shd.	4360	320 0	49 6	19 0	2	9000	Devonp'rt	Thomson	1893	223,267	4½	2–1	2 6-in. Q.F., 8 4·7-in., 8 6-pr., 1 3-pr. 4 M., 1 l.	4	19·5	400	312
T. G. B.	Hussar	S.	1070	250 0	30 6	9 0	2	3500	Devonp'rt	Hawthorn	1894	72,886	4½	..	2 4·7-in. Q.F., 4 6-pr.	3	19·0	100	120
Sloop	Icarus	C.	970	167 0	32 0	13 6	1	1200	Devonp'rt	Barrow	1885	x 52,104	..	..	8 5-in., 4 3-pr. Q.F., 4 M. 1 l.	..	12·2	150	126
2nd cl. Cr.	Inconstant	I. shd.	5780	337 4	50 3	25 6	1	4200	Pembroke	Penn	1868	213,324	..	..	6 6½-ton M.L.R., 2 3-pr. Q.F., 11 M., 8 l.	..	16·20	750	631
" "	Indefatigable	S. shd.	3600	300 0	43 8	17 6	2	9000	Glasgow	London and Glasgow	1891	181,024							
" "	Intrepid	S. shd.	3600	300 0	43 8	17 6	2	9000	Glasgow	London and Glasgow	1891	181,157	4½	2–1	2 6-in. Q.F., 6 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	19·75	400	273
" "	Iphigenia	S. shd.	3600	300 0	43 8	17 6	2	9000	Glasgow	London and Glasgow	1891	181,879							
" "	Iris	S.	3730	300 0	46 0	22 0	2	6000	Pembroke	Maudslay	1877	213,186	..	..	13 5-in., 4 3-pr. Q.F., 8 M., 1 l.	3	18·0	780	450
" "	Isis	S. shd.	5600	350 0	54 0	21 0	2	9600	Glasgow	London and Glasgow Co.	1896	252,067	4½	2½	5 6-in. Q.F., 6 4·7-in., 9 12-pr., 1 3-pr., 4 M., 1 12-pr. boat.	4 (2 sub.)	19·5*	550	450
" "	Juno	S. shd.	5600	350 0	54 0	21 0	2	9600	Barrow	Barrow	1895	254,097							
T. G. B.	Jaseur	S.	810	230 0	27 0	8 9	2	3711	Barrow	Barrow	1892	48,238	4½	..	2 4·7-in. Q.F., 4 3-pr.	3	19·25	100	91
" "	Jason	S.	810	230 0	27 0	8 9	2	3540	Barrow	Barrow	1892	49,253 x							
" "	Karrakatta (Australia)	S.	735	230 0	27 0	8 3	2	3500	Elswick	Bellis	1890	47,619	4½	..	2 4·7-in. Q.F., 4 3-pr.	3	20·0	100	91

x Includes Gun Mountings, &c.

* Isis: trial, 20·1 knots; Juno, 20 knots.

GREAT BRITAIN.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no					£	in.	in.			knots.	tons.	
3rd cl. Cr.	Katoomba (Australia)	S.	2575	265 0	41 0	15 6	2	7500	Elswick	Hawthorn	1889	116,719	4½	2–1	8 4·7-in. Q.F., 8 3-pr., 4 M., 1 l.	4	19·0	300	217
1st cl. G. V.	Landrail	S.	950	195 0	28 0	10 6	2	1200	Devonp'rt	Penn	1886	49,963	..	..	1 6-in., 3 5-in., 4 3-pr. Q.F., 3 M.	..	14·5	250	46
1st cl. G. B.	Lapwing	C.	805	165 0	31 0	11 7½	2	1200	Devonp'rt	Devonport	1889	39,952	..	..	6 4-in. 25-cwt., 2 3-pr. Q.F., 2 M.	..	13·0	105	76
2nd cl. Cr.	Latona	S.	3400	300 0	43 0	16 6	2	9000	Barrow	Barrow	1890	171,068	4½	2–1	2 6-in. Q.F., 6 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	20·0	400	273
,, ,,	Leander	S.	4300	300 0	46 0	20 6	2	5000	Glasgow	Napier	1882	148,453	..	1½	10 6-in. Q.F., 4 3-pr., 10 M., 2 l.	4	16·6	1000*	309
T. G. B.	Leda	S.	810	230 0	27 0	8 9	2	3597	Sheerness	Penn	1892	62,145	4½	..	2 4·7-in. Q.F., 4 3-pr.	3	19·25	100	91
2nd cl. G. V.	Linnet	C.	756	165 0	29 0	10 11	2	870	Blackwall	Rennie	1880	35,663	..	..	2 90-cwt. M.L.R., 4 6-pr. Q.F., 2 M.	..	11·80	180	92
1st cl. G. B.	Lizard	C.	715	165 0	29 0	11 10	1	1000	Belfast	Harland	1886	52,770	..	..	6 4-in., 4 M.	..	13·0	105	76
3rd cl. Crs.	Magicienne / Marathon	S. shd.	2950	265 0	42 0	17 6	2	9000	Glasgow	Hawthorn	1888	136,000	..	1½	6 6-in., 9 6-pr. Q.F., 1 3-pr., 3 M., 1 l.	4	19·0	400	218
1st cl. G. B.	Magpie	C.	805	165 0	31 0	11 7½	1	1200	Pembroke	Earle	1889	x 38,700	..	..	6 4-in., 4 M.	..	13·0	105	76
3rd cl. Crs.	Medea / Medusa	S.	2800	265 0	41 0	16 6	2	9000	Chatham	Humphrys	1888	x 141,700	..	1½	6 6-in., 9 6-pr. Q.F., 1 3-pr., 3 M., 1 l.	4	19·0	400	218
2nd cl. Cr.	Melampus	S.	3400	300 0	43 0	16 6	2	9000	Barrow	Barrow	1890	171,635	4½	2–1	2 6-in. Q.F., 6 4·7 in., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	20·0	400	273
Sloop	Melita	C.	970	167 0	32 0	13 6	1	1200	Malta	Malta Dock Yard	1888	60,179	..	..	8 5-in., 8 M., 1 l.	..	12·50	150	125
3rd cl. Cr.	Melpomene	S. shd.	2950	265 0	41 0	17 6	2	9000	Portsm'th	Palmer Co.	1888	x 142,000	..	1½	6 6-in. Q.F., 9 6-pr., 1 3-pr., 3 M., 1 l.	4	19·0	400	218
2nd cl. Cr.	Mercury		3730	300 0	46 0	20 2	2	6000	Pembroke	Maudslay	1878	213,252	..	..	13 5-in., 6 3-pr. Q.F., 9 M., 1 l.	4	16·8	780	291
,, ,,	Mersey	S.	4050	300 0	46 0	19 6	2	6000	Chatham	Humphrys	1885	154,000	4	3–2	2 15-ton, 10 6-in., 3 6-pr. Q.F., 8 3-pr. 5 M., 2 l.	4	17·3	900	327
3rd cl. Cr.	Mildura (Australia)	S.	2575	265 0	41 0	15 6	2	7500	Elswick	Hawthorn	1889	116,062	4½	2–1	8 4·7-in. Q.F., 8 3-pr., 4 M., 1 l.	4	19·0	300	217
2nd cl. Cr.	Minerva	S. shd.	5600	350 0	53 0	20 6	2	9600	Chatham	Chatham	1895	244,046	4½	1½–3	5 6-in. Q.F., 6 4·7-in., 9 12-pr., 1 3-pr., 4 M., 1 12-pr. boat.	3 (2 sub.)	19·5†	550	437
3rd cl. Cr.	Mohawk	S.	1770	225 0	36 0	14 6	2	3500	Glasgow	Thomson	1886	x 87,583	..	..	6 6-in., 8 3-pr. Q.F., 2 M., 1 l.	3	16·5	475	172
2nd cl. Cr.	Naiad	S.	3400	300 0	43 0	16 6	2	9000	Barrow	Barrow	1890	171,445	4½	2–1	2 6-in. Q.F., 6 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	20·0	400	273
1st cl. Cr.	Niobe	S.	11,000	435 0	69 0	26 0	2	16,500	Barrow	Barrow	1897	..	4½	3–6	16 6-in. Q.F., 14 12-pr., 12 3-pr., 2 12-pr. boat.	3 (2 sub.)	20·5	1000	600
Sloop	Nymphe	C.	1140	195 0	28 0	12 6	1	2000	Portsm'th	Greenock F'ndry Co.	1888	x 57,600	..	..	8 5-in., 8 M.	..	14·0	160	138
T. G. B.	Niger	S.	810	230 0	27 0	8 9	2	3784	Barrow	Barrow	1892	48,177	4½	..	2 4·7-in. Q.F., 4 3-pr.	3	19·25	100	91
,, ,,	Onyx	S.	810	230 0	27 0	8 9	2	3548	Birkenh'd	Laird	1892	53,961							
3rd cl. Cr.	Pallas	S.	2575	265 0	41 0	15 6	2	7610	Portsm'th	Hawthorn	1890	148,828	4½	2–1	8 4·7-in. Q.F., 8 3-pr., 4 M., 1 l.	4	19·0	300	217
,, ,,	Pearl	S.	2575	265 0	41 0	15 6	2	7500	Pembroke	Earle	1890	151,693							
1st cl. G. B.	Partridge	C.	755	165 0	30 0	11 4	1	1200	Devonp'rt	Devonport	188?	37,800	..	..	6 4-in., 4 M.	..	13·25	105	76
,, ,,	Peacock	C.	755	165 0	30 0	11 4	1	1200	Pembroke	Barrow Co.	188?	37,600							
Sloop	Pelican	C.	1130	170 0	36 0	15 3	1	800	Devonp'rt	Humphrys	187?	56,221	..	..	2 6-in., 6 5-in., 4 M., 1 l.	..	10·6	130	145

x Includes Gun Mountings, &c. * Bunker capacity. † Minerva: trial, 20·3 knots.

GREAT BRITAIN.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.					£	in.	in.			knots.	tons.	
3rd cl. Cr.	Pactolus	S.	2135	300	36 6	17 0	2	7000	Elswick	..	1897	..							
" "	Pegasus	S.	2135	300	36 6	17 0	2	7000	Jarrow	Palmer	1897	..							
" "	Pelorus	S.	2135	300 0	36 6	17 0	2	7000	Sheerness	Thomson	1896	..							
" "	Perseus	S.	2135	300	36 6	17 0	2	7000	Hull	Earle	Bldg.	..							
" "	Pomone	S.	2135	300	36 6	17 0	2	7000	Sheerness	..	Bldg.	..	·22	2	8 4-in. Q.F., 8 3-pr., 2 l.	2	20·0*	250	224
" "	Prometheus	S.	2135	300	36 6	17 0	2	7000	Hull	Earle	Bld	..							
" "	Proserpine	S.	2135	300 0	36 6	17 0	2	7000	Sheerness	Devonport	1896	..							
" "	Pyramus	S.	2135	300	36 6	17 0	2	7000	Jarrow	Palmer	Bldg.	..							
" "	3 Pelorus class	S.	2135	300	36 6	17 0	2	7000	..	..	Pro.	..							
Sloop	Penguin	C.	1130	170 0	36 0	16 1	1	700	Glasgow	Hawthorn.	1876	52,111	..	..	2 64-pr. M.L.R., 2 M., 1 l.	..	11·0	150	145
2nd cl. Cr.	Phaeton	S.	4300	300 0	46 0	20 6	2	5000	Glasgow	Napier	1883	145,198	..	1½	10 6-in. Q.F., 4 3-pr., 10 M., 2 l.	4	16·6	1000†	309
1st cl. G. B.	Pheasant	C.	755	165 0	29 0	11 4	1	1200	Devonp'rt	Devonport	1888	*x* 37,800	..	..	6 4-in., 4 M.	..	13·25	105	76
3rd cl. Cr.	Philomel	S.	2575	265 0	41 0	15 6	2	7500	Devonp'rt	Earle	1890	156,102	4½	2–1	8 4·7-in. Q.F., 8 3-pr., 4 M., 1 l.	2	19·0	300	217
" "	Phœbe	S.	2575	265 0	41 0	15 6	2	7500	Devonp'rt	Devonport	1890	161,154							
Sloop	Phœnix	S. shd.	1050	185 0	32 6	11 3	2	1400	Devonp'rt	Devonport	1895	63,930	·22	..	6 4-in. Q.F., 4 3-pr., 3 M.	..	13·0	160	106
1st cl. G. B.	Pigeon	C.	755	165 0	30 0	11 4	1	1200	Pembroke	Barrow	1888	*x* 37,800							
" "	Pigmy	C.	755	165 0	30 0	11 4	1	1200	Sheerness	Barrow	1888	37,700	..	..	6 4-in., 4 M.	..	13·25	105	76
" "	Plover	C.	755	165 0	30 0	11 4	1	1200	Pembroke	Barrow	1888	37,700							
2nd cl. Cr.	Pique	S. shd.	3600	300 0	43 8	17 6	2	9000	Jarrow	Palmer	1890	184,108	4½	2–1	2 6-in. Q.F., 6 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	19·75	400	273
T. Ram	Polyphemus	S.	2640	240 0	40 0	20 0	2	5500	Chatham	Humphrys.	1881	174,450	..	3–2	6 6-pr. Q.F., 2 M.	5	18·0	300	..
3rd cl. Cr.	Porpoise	S.	1770	225 0	36 0	14 6	2	3500	Glasgow	Thomson	1886	87,583	..	..	6 6-in., 8 3-pr. Q.F., 2 M., 1 l.	3	16·5	475	172
1st cl. Cr.	Powerful	S. shd.	14,200	500 0	71 0	27 0	2	25,000	Barrow	Barrow	1895	674,879	6	3–6	2 9·2-in., 12 6-in. Q.F., 18 12-pr., 12 3-pr., 9 M., 2 12-pr. boat	4	22·0‡	1500§	840
3rd cl. Cr.	Pylades	C.	1420	200 0	38 0	15 9	1	1400	Sheerness	Laird	1884	62,000	..	1¼	14 5-in., 8 M., 1 l.	..	12·6	400	170
Sloop	Racer	C.	970	167 0	32 0	14 0	1	850	Devonp'rt	Hawthorn.	1884	49,000	..	..	8 5-in., 8 M., 1 l.	..	11·0	150	125
3rd cl. Cr.	Racoon	S.	1770	225 0	36 0	13 6	2	4500	Devonp'rt	Harland	1887	*x* 91,606	..	..	6 6-in., 8 3-pr. Q.F., 2 M., 1 l.	3	17·5	475	176
2nd cl. Cr.	Rainbow	S. shd.	3600	300 0	43 8	17 6	2	9681	Jarrow	Palmer	1891	184,086	4½	2–1	2 6-in. Q.F., 6 4·7-in., 8 6-pr., 1 3-pr., 4 M, 1 l.	4	19·7	400	273
" "	Raleigh	I. shd.	5200	298 0	49 0	24 7	1	4200	Chatham	Humphrys.	1873	193,386	..	..	8 90-cwt. M.L.R., 8 6-in., 8 5-in., 12 M., 4 l.	2	13·9	550	571
2nd cl. G. Ves.	Rambler	C.	835	157 0	29 6	13 7	1	650	Glasgow	Elder	1880	37,038	..	..	2 20-pr., 1 M., 1 l.	..	10·66	40	160
3rd cl. Cr.	Rapid	C.	1420	200 0	38 0	15 9	1	1400	Devonp'rt	Maudslay	1883	68,226	..	1¼	2 6-in., 10 5-in., 4 M., 1 l.	..	12·6	400	171
1st cl. G. B.	Rattler	C.	715	165 0	29 0	11 0	1	1200	Elswick	Hawthorn.	1886	*x* 38,734	..	..	6 4-in., 4 M.	..	13·6	105	76
T. G. B.	Rattlesnake	S.	550	200 0	23 0	8 0	2	2700	Birkenh'd	Laird	1886	*x* 35,425	..	..	1 4-in., 6 3-pr. Q.F.	4	18·5	100	67
2nd cl. G. B.	Raven	C.	465	125 0	23 6	10 0	1	360	Poplar	Rennie	1882	21,050	..	..	2 64-pr. M.L.R., 2 20-pr., 2 M.	..	9·5	40	62
1st cl. G. B.	Redbreast	C.	805	165 0	31 0	11 7½	1	1200	Pembroke	Earle	1888	38,700	..	..	6 4-in., 4 M.	..	13·0	105	76
" "	Redpole																		
2nd cl. G. B.	Redwing	C.	461	125 0	23 6	10 0	1	360	Pembroke	Maudslay	1880	22,200	..	..	2 20-cwt., 2 M.	..	9·68	40	..
T. G. B.	Renard	S.	810	230 0	27 0	8 9	2	3500	Birkenh'd	Laird	1892	53,848	4½	..	2 4·7 in. Q.F., 4 3-pr.	3	19·25	100	91

x Includes Gun Mountings, &c. * Pelorus: trial, 20·7 knots. † Bunker capacity. ‡ Trial, 21·8 knots. § Bunker capacity, 3000.

GREAT BRITAIN.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Cost.	Armour: Gun Position.	Armour: Deck.	Armament: Guns.	Armament: Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.					£	in.	in.			knots.	tons.	
2nd cl. Cr.	Retribution	S. shd.	3600	300 0	43 8	17 6	2	9000	Jarrow	Palmer	1891	183,975	4½	2–1	2 6-in. Q.F., 6 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	19·75	400	275
3rd cl. Cr.	Ringarooma (Australia)	S.	2575	265 0	41 0	15 6	2	7500	Glasgow	Thomson	1890	128,076	4½	2–1	8 4·7-in. Q.F., 8 3-pr. Q.F., 4 M., 1 l.	4	19·0	300	216
1st cl. G. B.	Ringdove	C.	805	165 0	31 5	11 7½	1	1200	Devonp'rt	Devonport	1889	39,753	..	..	6 4-in., 2 3-pr. Q.F., 2 M.	..	13·0	105	76
1st cl. Cr.	Royal Arthur	S. shd.	7700	360 0	60 0	23 9	2	12,000	Portsm'th	Maudslay	1891	402,414	6	5–1	1 9·2-in., 12 6-in. Q.F., 12 6-pr., 5 3-pr., 7 M., 2 l.	4 (2 sub.)	19·7	850	567
3rd cl. Cr.	Royalist	C.	1420	200 0	38 0	15 9	1	1400	Devonp'rt	Maudslay	1883	68,173	..	1¼	2 6-in., 10 5-in., 4 M., 1 l.	..	12·6	400	171
1st cl. Cr.	St. George.	S. shd.	7700	360 0	60 8	23 9	2	12,000	Hull	Maudslay	1892	377,204	6	5–1	2 9·2-in., 10 6-in. Q.F., 12 6-pr., 5 3-pr., 7 M., 2 l.	4 (2 sub.)	19·7	850	559
T. G. B.	Salamander	S.	735	230 0	27 0	8 3	2	3500	Chatham	Maudslay	1889	57,911	4½	..	2 4·7-in. Q.F., 4 3-pr. Q.F.	3	20·0	100	91
" "	Sandfly	S.	525	200 0	23 0	8 9	2	2700	Devonp'rt	Maudslay	1887	x 36,167	·22	..	1 4-in., 6 3-pr. Q.F.	4	19·0	80	67
2nd cl. Cr.	Sappho	S.	3400	300 0	43 0	16 6	2	9861	Poplar	Penn	1891	171,853	4½	2–1	2 6-in. Q.F., 6 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	20·47	400	..
3rd cl. Cr.	Satellite	C.	1420	200 0	38 0	15 9	1	1400	Sheerness	Humphrys	1881	62,900	..	1¼	2 6-in., 6 5-in., 4 M., 1 l.	..	12·6	400	167
" "	Scout.	S.	1580	220 0	34 0	14 6	2	3200	Glasgow	Thomson	1885	x 87,516	..	..	4 5-in., 8 3-pr. Q.F., 2 M., 1 l.	3 (1 sub.)	16·7	450	147
2nd cl. Cr.	Scylla	S.	3400	300 0	43 0	16 6	2	9280	Poplar	Penn	1892	171,593	4½	2–1	2 6-in. Q.F., 6 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	20·62	400	273
T. G. B.	Seagull	S.	735	230 0	27 0	8 3	2	3500	Chatham	Maudslay	1889	56,922							
" "	Sharpshooter	S.	735	230 0	27 0	8 3	2	3500	Devonp'rt	Bellis	1888	x 50,029							
" "	Sheldrake	S.	735	230 0	27 0	8 3	2	3500	Chatham	Maudslay	1889	57,800							
" "	Skipjack	S.	735	230 0	27 0	8 3	2	3500	Chatham	Laird	1889	59,531	4½	..	2 4·7-in., 4 3-pr. Q.F.	3	20·0	100	91
" "	Spanker*	S.	735	230 0	27 0	8 3	2	3500	Devonp'rt	Bellis	1889	50,000							
" "	Speedwell	S.	735	230 0	27 0	8 3	2	3500	Devonp'rt	Laird	1889	52,000							
1st cl. Cr.	Spartiate	S.	11,000	435 0	69 0	26 0	2	16,500	Pembroke	..	Bldg.	..	4½	3–6	16 6-in. Q.F., 14 12-pr., 12 3-pr., 2 12-pr. boat.	..	20·5	1000	600
2nd cl. Cr.	Severn	S.	4050	300 0	46 0	19 6	2	6000	Chatham	Humphrys	1885	x 212,621	4	3–2	2 8-in., 10 6-in. Q.F., 3 6-pr., 2 3-pr., 10 M., 2 l.	..	17·3	900	327
" "	Sirius	S. shd.	3600	300 0	43 8	17 6	2	9000	Elswick	Maudslay	1890	186,649							
" "	Spartan	S. shd.	3600	300 0	43 8	17 6	2	9000	Elswick	Maudslay	1891	186,351	4½	2–1	2 6-in. Q.F., 6 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	19·75	400	273
1st cl. G. B.	Sparrow	C.	805	165 0	31 0	11 7½	1	1200	Greenock	Greenock	1889	39,000	..	..	6 4-in., 2 3-pr. Q.F., 2 M.	..	13·0	105	76
T. G. B.	Speedy	S.	810	230 0	27 0	8 9	2	4703	Chiswick	Thornycroft	1893	58,927	4½	..	2 4·7-in. Q.F., 4 3-pr.	3	20·21	100	91
" "	Spider	S.	525	200 0	23 0	8 9	2	2700	Devonp'rt	Maudslay	1887	x 36,300	·22	..	1 4-in., 6 3-pr. Q.F.	4	19·0	80	67
2nd cl. G. B.	Starling	C.	465	125 0	23 6	10 0	1	360	Poplar	Rennie	1882	21,100	..	..	2 64-pr. M.L.R., 2 20-pr., 2 M.	..	9·5	40	61
" "	Stork	C.	465	125 0	23 6	10 0	1	360	Poplar	Rennie	1882	21,150	..	..	1 M., 2 l.	..	9·5	40	..
D. V.	Surprise	S.	1650	250 0	32 6	14 0	2	3000	Jarrow	Palmer	1885	x 78,764	..	..	4 5-in., 4 6-pr. Q.F., 2 M	..	17·0	400	..
Sloop	Swallow	C.	1130	195 0	28 0	11 6	2	1500	Sheerness	Rennie	1885	59,797	..	..	8 5-in., 8 M.	..	13·5	280	135

* Du Temple W. T. boilers; trial: 3920 H.P., 20 knots.

x Includes Gun Mountings, &c.

GREAT BRITAIN.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Cost.	Armour: Gun Position.	Armour: Deck.	Armament: Guns.	Armament: Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.						£	in.	in.			knots.	tons.	
2nd cl. G. V.	Swift	C.	756	165 0	29 0	10 11	2	870	Blackwall	Rennie	1879	34,670	..	..	2 90-cwt. M.L.R., 4 6-pr. Q.F., 2 M.	..	11·81	180	92
2nd cl. Cr.	Sybille	S.	3400	300 0	42 0	16 6	2	9496	Stephenson.	Hawthorn.	1890	174,670	4½	2–1	2 6-in. Q.F., 6 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	20·0	400	273
" "	Talbot	S. shd.	5600	350 0	53 6	21 0	2	9600	Devonp'rt	Devonport	1895	273,856	4½	1½–3	5 6-in. Q.F., 6 4·7-in., 9 12-pr., 1 3-pr., 4 M., 1 l.	3 (2 sub.)	19·5*	550	433
3rd cl. Cr.	Tartar	S.	1770	225 0	36 0	14 3½	2	3500	Glasgow	Thomson	1886	x 87,583	..	..	6 6-in., 8 3-pr. Q.F., 2 M., 1 l.	3	16·5	325	177
" "	Tauranga (Australia)	S.	2575	265 0	41 0	15 6	2	7500	Glasgow	Thomson	1889	128,101	4½	2–1	8 4·7-in. Q.F., 8 3-pr. Q.F., 4 M., 1 l.	4	19·0	300	212
2nd cl. Cr.	Terpsichore	S.	3400	300 0	43 0	16 6	2	9000	Glasgow	Thomson	1890	173,341	4½	2–1	2 6-in. Q.F., 6 4·7-in., 8 6-pr., 1 3-pr., 9 M., 1 l.	4	20·0	400	275
1st cl. Cr.	Terrible	S. shd.	14,200	500 0	71 0	27 0	2	25,000	Glasgow	Thomson	1895	681,419	6	3–6	2 9·2-in., 12 6-in. Q.F., 18 12-pr., 12 3-pr., 9 M., 2 12-pr. boat.	4	22·4 (*t*)	3000	840
2nd cl. Cr.	Thames	S.	4050	300 0	46 0	19 6	2	5700	Pembroke	Penn	1885	205,452	4	3–2	2 8-in., 10 6-in., 3 6-pr. Q.F., 8 3-pr., 6 M., 2 l	2	16·8	900	326
1st cl. Cr.	Theseus	S.	7350	360 0	60 0	23 9	2	12,000	Blackwall	Maudslay	1892	347,577	6	5–1	2 9·2-in., 10 6-in. Q.F., 12 6-pr., 5 3-pr., 7 M., 2 l.	4 (2 sub.)	20·0	850	544
2nd cl. Cr.	Thetis	S.	3400	300 0	43 0	16 6	2	9000	Glasgow	Thomson	1890	173,146	4½	2–1	2 6-in. Q.F., 6 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	20·0	400	273
" "	Tribune	S.	3400	300 0	43 0	16 6	2	9000	Glasgow	Thomson	1891	173,006							
1st cl. G. B.	Thrush	C.	805	165 0	31 0	11 7½	1	1200	Greenock	Greenock F'ndry Co.	1889	39,000	..	..	6 4-in., 2 3-pr. Q.F., 2 M.	..	13·0	105	76

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Cost.	Armour: Gun Position.	Armour: Deck.	Armament: Guns.	Armament: Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
Sloop	Torch	S. shd.	960	180 0	32 6	11 6	1	1400	Sheerness	Sheerness	1894	60,561	..	..	6 4-in. Q.F., 4 3-pr., 2 M.	..	13·25	130	..
"	2 Unnamed	S. shd.	960	180 0	32 6	11 6	2	1400	Sheerness	Sheerness	Pro.	..	..	..					
2nd cl. Cr.	Venus	S. shd.	5600	350 0	54 0	21 2	2	9600	Glasgow	Elder	1895	249,938	4½	2½	5 6-in. Q.F., 6 4·7-in., 8 12-pr., 7 3-pr., 4 M., 1 12-pr. boat	3 (2 sub.)	19·5*	550	450
2nd cl. Cr.	Vindictive	S.	5800	320 0	54 0	..	2	10,000	Chatham	Maudslay	1896	..	4½	1–2 N S.	4 6-in. Q.F., 6 4·7-in., 8 12-pr., 3 3-pr., 1 12-pr. boat, 5 M.	2	19·5	500	450
2nd cl. Cr.	Volage	I. shd.	3080	270 0	42 0	22 0	1	2400	Blackwall	Ravenhill	1874	132,817	..	..	10 6-in., 2 64-pr. M.L.R., 10 M., 2 l.	..	12·8	420	339
T. D. S.	Vulcan	S.	6620	350 0	58 0	23 0	2	12,032	Portsm'th	Humphrys	1889	370,447	4½	5–2½	8 4·7-in. Q.F., 12 3-pr., 16 M., 1 l.	6 (2 sub.)	20·0	1000	433
3rd cl. Cr.	Wallaroo (Australia)	S.	2575	265 0	41 0	15 6	2	7500	Elswick	Hawthorn	1889	115,995	4½	2–1	8 4·7-in. Q.F., 8 3-pr., 4 M., 1 l.	4	19·0	300	218
1st cl. G. B.	Widgeon	C.	805	165 0	30 0	11 7½	1	1200	Pembroke	Rennie	1889	39,315	..	..	6 4-in., 2 3-pr. Q.F., 2 M.	..	13·0	105	76
2nd cl. G. B.	Wrangler	C.	465	125 0	23 6	10 6	1	360	Barrow	Barrow	1880	22,727	..	..	2 64-pr. M.L.R., 2 20-pr., 2 M.	..	9·88	40	61

x Includes Gun Mountings, &c.

* Talbot: trial, 20 knots; Venus, 20·1 knots.

Paddle Wheel Vessels.—Adventure, Alecto, Cockatrice, Dove, Herald, Mosquito, Pioneer, Research (surveying vessel), Sphinx, Triton (surveying vessel).

Twin Screw Gun Boats (Iron).—Dee, Don, Esk, Medina, Medway, Sabrina, Slaney, Spey, Tay, Tees, Trent, Tweed, 373 tons; 320 to 410 I.H.P.

Twin Screw Iron or Steel Gun Boats (Staunch Type).—Ant, Arrow, Badger, Blazer, Bloodhound, Bonnetta, Bouncer, Bulldog, Bustard, Comet, Cuckoo, Fidget, Gadfly, Griper, Hyena, Insolent, Kite, Mastiff, Pickle, Pike, Pincher, Plucky, Scourge, Snake, Snap, Staunch, Tickler, Weasel, 180 to 254 tons; 130 to 270 I.H.P.

Royal Naval Reserved Merchant Cruisers.

—	Name.	Owners.	Length.	Breadth.	Maximum Draught of Water for the Admiralty List.	Gross Tonnage.	Indicated Horse-Power.	Ocean Speed.
			Feet.	Feet.	Feet.	Tons.		Knots.
Ships in receipt of an Annual subvention and permitted to fly the blue ensign.	Campania	Cunard Company	610	65	26	12,950	30,000	21
	Lucania	" "	610	65	26	12,950	30,000	21
	Himalaya	Peninsular and Oriental Co.	465½	52	22½	6,898	10,000	17
	Australia	" " "	465½	52	22½	6,901	10,000	17
	Victoria	" " "	466	52	22½	6,091	7,000	16
	Arcadia	" " "	466	52	22½	6,188	7,000	16
	Majestic . 2 s.	White Star Company	565	58	24½	9,965	16,000	20
	Teutonic . 2 s.	" "	565	58	24½	9,984	16,000	20
	Empress of India . 2 s.	Canadian Pacific Railway Co.	440	51	24½	5,905	10,000	16
	Empress of China . 2 s.	" " "	440	51	24½	5,905	10,000	16
	Empress of Japan . 2 s.	" " "	440	51	24½	5,905	10,000	16
Ships held at the disposition of the Admiralty without subsidy.	Etruria	Cunard Company	501½	57	26	8,120	14,500	19½
	Umbria	" "	501½	57	26	8,128	14,500	19½
	Servia	" "	515	52	26	7,392	10,000	16½
	Gallia	" "	430	44½	24	4,809	5,300	15½
	Aurania	" "	470	57	27	7,269	9,500	17
	Britannic	White Star Company	455	45	25	5,004	5,200	16
	Germanic	" "	455	45	25	5,008	5,200	16
	Adriatic	" "	437	40½	23	3,888	3,600	15
	Britannia	Peninsular and Oriental Co.	466	52	22½	6,061	7,000	16
	Oceana	" " "	466	52	22½	6,188	6,000	16
	Peninsular	" " "	410½	48	..	5,000	4,972	15
	Oriental	" " "	410½	48	..	5,000	4,972	15
	Valetta	" " "	420½	45	22½	4,904	5,000	15
	Massilia	" " "	420½	45	22½	4,902	5,000	15
	Rome	" " "	430	44½	22½	5,545	5,500	15
	Carthage	" " "	430	44½	22½	4,879	5,000	15
	Ballarat	" " "	420	43	22½	4,748	4,500	14
	Parramatta	" " "	420	43	22½	4,756	4,500	14

There are also numerous ships on the Admiralty List complying with Admiralty conditions as to subdivision which have no national tie. They are suitable for receiving an armament, but there is no arrangement with Owners, except the promise of preference for occasional State employment.

GREAT BRITAIN, COLONIES, &c.—Cruising Ships, Gunboats, &c.

To what Government belonging.	Class of Ship.	Name.	Material of Construction.	Propellers.	Where Built.	When Launched.	Length.	Breadth.	Draught of Water.	Displacement.	Indicated Horse-Power.	Speed.	Coal Stowage.	Armament.
							ft. in.	ft. in.	ft. in.				tons.	
INDIA	T. G.B.	Assaye	Steel	2	Elswick	1891	230 0	27 0	8 3	735	3,500	19·0	100	2 4·7-in. Q.F., 4 3-pr. do., 1 f. tu. & 3 l. car.
INDIA	D. V.	Lawrence	Steel	Pad.	B'kenh'd	1886	212 2	32 2	18 3	1,154	1,277	13·5	270	Four 4-inch B.L.R., 4 6-pr. Q.F., 4 M.
INDIA	T. G. B.	Plassy	Steel	2	Elswick	1890	230 0	27 0	8 3	735	3,500	19·0	100	2 4·7-in. Q.F., 4 3-pr. do., 1 f. tu. & 3 l. car.
QUE'NS-LAND.	Gun-vessel	Gayundah	Steel	2	Glasgow	1884	115 0	25 0	10 0	450	400	10·0	..	One 8-in. 11½-ton; one 6-in. 4-ton; one 3-pr. Q.F.; 2 M.
QUE'NS-LAND.	Gun-vessel	Paluma	Steel	2	Glasgow	1884	115 0	25 0	10 0	450	340	10·0	..	One 8-in. 11½-ton; one 6-in. 4-ton; one 3-pr. Q.F.; 2 M.
SOUTH AUS-TRALIA	Cruiser	Protector	Steel	2	..	1884	188 0	3 0	12 6	920	1,640	14·0	..	One 8-in. 11½-ton; five 6-in. 4-ton; five Gatlings.

The five second-class Cruisers, and the two Torpedo-Gunboats of the Australian Auxiliary Squadron, are included in the list of Ships of the Royal Navy, as well as the armour-clads, Abyssinia, Cerberus, and Magdala.

ARGENTINE REPUBLIC.—Armoured Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Battery or Turret.	Armour. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.†	ft. in.	ft. in.	ft. in.					£	inches.	inches.	inches.			knots.	tons.	
c.b.	Almirante Brown *	S.	4200	240 0	50 0	20 6	2	4500	Poplar	1880	190,000	9 (cp.)	8 (cp.)	1½	8 8-in. (Armstrong), 6 4·7-in. Q.F., 2 3-pr., 6 M.	2	13·75	650	350
c.d.s.t.	Andes	I.	1535	186 0	44 0	9 6	2	750	Birkenhead	1875	85,600	6	9	1	2 11-in., 2 4·7-in., 4 M.	..	9·5	120	120
c.d.s.t.	Plata	I.	1535	186 0	44 0	9 6	2	750	Birkenhead	1874	85,600								
a.c.	Garibaldi (ex Giuseppe Garibaldi I.)	S.	6810	328 0	59 8	24 0	2	13,384 (*t*)	Sestri Ponente	1895	681,240	6	6	1½	2 10-in., 10 6-in. Q.F., 6 4·7 in., 10 2·2 in., 10 1·4 in., 2 M.§	4	19·9 (*t*)	1000‡	450
c.d.s.b.	Independencia	S.	2300	230 0	44 4	13 0	2	3000	Birkenhead	1891	176,600	8 (cp.)	8 (cp.)	2	2 9·4-in., 4 4·7-in. Q.F., 4 3-pr., 4 M.	2	14·4	340	225
c.d.s.b.	Libertad	S.	2300	230 0	44 4	13 0	2	3000	Birkenhead	1890	176,600								
a.c.	San Martino (ex Varese I.)	S.	6840	328 0	59 8	24 0	2	13,000	Leghorn	1896	664,600	6	6	1½	2 10-in., 10 6-in. Q.F., 6 4·7, 10 2·2, & 10 1·4 in. Q.F., 2 M.§	4	20·0	1000‡	450

* Receiving new armament at St. Nazaire.

† Displacement of above vessels, except Garibaldi and San Martino in English tons.

‡ Bunker capacity, in addition to liquid fuel.

§ Armament of Garibaldi, San Martino, and Q.F. guns of Libertad and Independencia are Armstrong.

ARGENTINE REPUBLIC.—Cruising Ships, &c.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour.		Armament.		Speed.	Normal Coal Supply.	Complement.
												Gun Position.	Deck.	Guns.	Torpedo Tubes.			
			metric tons.	ft. in.	ft. in.	ft. in.	no.				£	inches.	inches.			knots.	tons.	
g.v.	Argentina	S.	820	192 0	27 0	13 0	1	850	Trieste	1883	25,500	..	..	1 6-in., 6 7-c.m. Krupp, 4 M.	..	12·0	220	120
cr.	Buenos Aires	S. shd.	4740	396 0	47 2	19 0	2	17,000	Elswick	1895	383,000	4½	1–5	2 8-in. Q.F. (Armstrong), 4 6-in. Q.F., 6 4·7-in. Q.F., 16 3-pr., 8 1-pr.	5	23·2*	1000‡	429
to.g.b.	Espora	S.	520	210 0	25 0	8 0	2	3500	Birkenhead	1890	..	..	..	3 3-in. Q.F., 4 3-pr., 2 M.	5	20·0	100	124
cr.	Nueve de Julio	S.	3570	354 0	44 0	19 6	2	14,350	Elswick	1892	293,000	4½	4½	4 6-in. Q.F. (Armstrong), 8 4·7-in., 12 3-pr., 12 1-pr.	5	22·74	770‡	300
cr.	Patagonia	S. & W.	1442	220 0	32 10	12 9	2	2400	Trieste	1885	100,000	..	1½	1 10-in., 3 6-in., 6 l., 10 M.	..	13·0	350	210
to.g.b.	Patria	S.	1070	250 0	31 0	10 0	2	4500	Birkenhead	1893	87,000	..	..	2 4·7-in. Q.F., 4 8-pr., 2 3-pr., 2 M.	5	20·75	288	159
g.v.	Paraná	I.	550	142 8	25 0	11 9	1	475	Birkenhead	1874	..	..	..	2 6-in., 2 4·7-in.	..	11·0	..	..
cr.	25 de Mayo	S.	3200	325 0	43 0	16 0	2	13,800	Elswick	1890	260,000	4½	4½	2 8·2-in. (Armstrong), 8 4·7-in. Q.F., 12 3-pr., 12 1-pr.	6	22·43	600‡	185
g.v.	Uruguay	I.	550	142 8	25 0	11 9	1	475	Birkenhead	1874	..	..	..	2 6-in., 2 4·7-in.	..	11·0	..	..

Messrs. Laird are building a training-ship (cruiser) of 2352 tons, 2000 I.H.P., and 13 knots speed, with nineteen guns and two torpedo-tubes.
There are several other small gunboats; also the torpedo-ram Maipù (1063 tons, 1750 I.H.P.), built in England in 1880.

* Natural draught. † Bunker capacity. ‡ Doubtful whether corresponding to displacement given.

AUSTRIA-HUNGARY.—Armoured Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length. ft.	in.	Beam. ft.	in.	Maximum Draught. ft.	in.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Position. Gun	Armour. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft.	in.	ft.	in.	ft.	in.					£	inches.	inches.	inches.			knots.	tons.	
c.d.s.	Budapest .	S.	5550	305	0	55	9	21	0	2	8500	Trieste .	1896	339,062	10·6 H.S.	10·6 H.S.	2½ H.S.	4 9·4-in., 6 5·9-in. Q.F., 14 47-m.m. Q.F., 2 M.	4	17·0	500	..
c.b.	Custoza . . .	I.	7060	302	3	58	0	24	6	1	4440	Trieste .	1872	414,400	9	7	1½	8 10·2-in. (Krupp), 11 Q.F., 8 l.	2	14·0	584	567
a.c.	"D". . . .	S.	6100	367	6	56	0	20	4		12,000	Trieste .	Bldg.	368,124	10·6 H.S.	9·8 H.S.	1½ H.S.	2 9·4-in., 8 5·9-in. Q.F., 18 smaller.	4	20·0	800	450
c.b.	Don Juan de Austria	I.	3550	240	3	50	0	20	0	1	2700	Trieste .	1875	..	8	6	1	8 8·2-in. (Krupp), 11 Q.F. & M., 6 l.	4	13·0	380	440
c.d.s.	Erzherzog Albrecht.	I.	5940	285	2	56	3	22	0	1	3600	Trieste. .	1872	357,600	9	7	1½	8 9·4-in. (Krupp), 11 Q.F., 8 l.	2	13·0	453	535
c.b.	Kaiser . . .	W.	5810	254	0	58	3	24	3	1	3200	Pola . .	1871	337,200	6	5½		10 9-in. (Armstrong) M.L.R., 11 Q.F. & M., l.	..	13·0	450	540
a.c.	Kaiserin Maria Theresia	S.	5270	351	0	52	6	21	4	2	9755	Trieste .	1893	304,187	4	4	2	2 9·4-in., 8 5·9-in. Q.F., 18 1·8 Q.F., 2 2·7-in. steel bronze, 2 M.	4	19·0	740	450
c.b.	Kaiser Max . .	I.	3566	240	3	50	0	20	0	1	2700	Trieste .	1875	211,600	8	6	1	8 8·2-in. (Krupp), 11 Q.F. & M., 6 l.	4	13·0	380	440
Riv. Mon.	Körös . . .	S.	448	177	0	29	6	4	0	2	1250	Buda Pesth	1892	..	2	3	¾	2 4·7-in. Q.F., 2 l., 1 M.		10·0	..	..
b.	Kronprinz Rudolph	S.	6940	295	0	62	4	25	3	2	7500	Pola . .	1887	330,000	12	10	2½	3 12-in. (Krupp), 6 4·7-in. Q.F., 11 smaller & M., 2 l.	4	16·0	600	492
b.	Kronprinzessin Stefanie	S.	5150	278	10	55	9	21	6	2	8300	Trieste .	1887	300,000	9	8	1	2 12-in. (Krupp), 6 5·9-in., 11 Q.F. & M., 2 l.	4	17·0	400	510
Riv. Mon. „	Leitha . . } Maros . . }	I. & S.	310	166	0	27	6	3	7	2	320	Buda Pesth	1871	20,000	1·7	2	1	1 4 7-in. Q.F., 2 M. . .	..	8·0	20	54
c.d.s.	Monarch . .	S.	5550	305	0	55	9	21	0	2	8500	Pola . .	1895	339,062	10·6 H.S.	10·6 H.S.	2½ H.S.	4 9·4-in., 6 5·9-in. Q.F., 14 47-m.m. Q.F., 2 M.	4	17·0	500	..
c.b.	Prinz Eugen . .	I.	3566	240	6	50	0	20	0	1	2700	Pola . .	1877	..	8	6	1	8 8·2-in (Krupp), 11 Q.F. & M., 6 l.	4	13·0	380	440
Riv. Mon.	Szamos . . .	S.	448	177	0	29	6	4	0	2	1250	Buda Pesth	1892	..	2	3	¾	2 4·7-in. Q.F., 2 Q.F., 1 M. . .	..	10·0	.	
c.b.	Tegetthoff . .	I. & S.	7390	286	11	71	1	24	10	2	8800	Trieste .	1878 R. 1893	..	14	14	3	6 9·4-in. (Krupp), 5 5·9-in. Q.F., 15 smaller do., 2 M.	4	16·3	670	578
c.d.s.	Wien . . .	S.	5550	305	0	55	9	21	0	2	8500	Trieste .	1895	339,062	10·6 H.S.	10·6 H.S.	2½ H.S.	4 9·4-in., 6 5·9 Q.F., 14 47-m.m. Q.F., 2 M.	4	17·6 (*t*)	500	..

AUSTRIA-HUNGARY.—Cruising Ships, &c.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			met.tns.	ft. in.	ft. in.	ft. in.					£	in.	in.			knots.	tons.	
corv.	Aurora	C.	1370	190 6	32 10	16 1	1	1000	Trieste	1873	..	..	..	2 4·7-in. (Wahrendorf), 5 l., 2 M. or Q.F.	..	11·0	160	200
to. g. b.	Blitz	S.	360	193 6	22 4	8 0	..	3500	Elbing	1888	..	..	..	9 Q.F.	..	21·0	250	61
cr. 3rd cl.	Donau	C.	2344	230 0	42 8	19 8	1	1800	Pola	1893	..	..	..	10 4·7-in. (Uchatius), 4 M., 1 l.	..	12·0	320	..
cr. 3rd cl.	Erzherzog Friedrich	W.	1590	173 10	39 5	16 9	1	800	Venice	1874	..	..	..	10 5·9-in. (Wahrendorf), 1 l.	..	9·0	200	261
cr. 3rd cl.	Fasana	C.	2000	223 3	39 5	16 9	1	1700	Trieste	1870	..	..	..	4 5·9-in. (Krupp), 2 Q.F., 1 l.	..	12·0	315	260
cr.	Frundsberg	C.	1370	190 6	32 10	16 1	1	1000	Trieste	1873	..	..	..	2 5·9-in. (Wahrendorf), 5 l., 2 M. or Q.F.	..	11·0	160	209
to. cr.	Helgoland (Ersatz) "B"	S.	2300	301 10	39 6	14 2	1	7800	..	Pro 1897	145,312	..	..	8 4·7 Q.F., 10 1·8-in., 2 M.	1	20·0	..	..
to. cr.	Jaguar (ex "A")																	
cr. 2nd cl.	Kaiserin Elizabeth	S.	4064	321 6	47 6	18 7	2	9000	Pola	1890	..	3·5	2¼	2 9·4-in. (Krupp), 6 5·9-in. do., 11 Q.F., 2 l.	5	19·0	660	450
cr. 2nd cl.	Kaiser Franz Joseph I.	S.	4030	321 6	47 6	18 7	2	9000	Trieste	1889	..	3·5	2¼	2 9·4-in. (Krupp), 6 5·9-in. do., 11 Q.F., 2 l.	5	19·0	660	450
to. g. b.	Komet	S.	360	193 6	22 4	8 0	..	3500	Elbing	1888	..	..	..	9 Q.F.	..	21·0	..	61
cr. 2nd cl.	Laudon	C.	3430	253 0	46 0	20 8	1	2600	Trieste	1873	..	..	..	15 5·9-in. (Krupp), 7 Q.F. & M., 2 l.	..	13·0	450	497
cr. 3rd cl.	Leopard	S.	1582	224 0	34 0	14 0	2	6000	Elswick	1886	200,000	..	..	2 4·7-in. Q.F., 10 Q.F. & M.	4	18·3	250	148
to. g. b.	Lussin	S.	1011	200 4	26 3	12 2	2	1830	Trieste	1883	..	..	1½	2 5·9-in. (Krupp), 7 M., 1 l.	..	14·0	200	142
to. g. b.	Magnet	S.	510	219 10	26 10	8 0	2	6000	Elbing	1896	51,052	..	..	6 1·8-in. Q.F.	3	26·0t	105	..
to. g. b.	Meteor	S.	350	187 0	22 4	8 0	2	3500	Elbing	1887	..	..	..	9 Q.F.	1	23.1	120	61
cr. 3rd cl.	Panther	S.	1582	224 0	34 0	14 0	2	6000	Elswick	1885	..	..	..	2 4·7-in. Q.F., 10 Q.F. & M.	4	18·5	250	148
to. deps.	‡Pelican	S.	2470	279 0	39 4	15 6	..	4600	Elbing	1891	..	..	..	2 5·9-in. (Krupp), 8 Q.F.	4	18·0	..	..
to. g. b.	Planet	S.	500	210 0	23 0	8 3	2	3500	Jarrow	1889	..	..	..	10 Q.F.	1	19·6	..	61
cr. 2nd cl.	Radetzky	C.	3450	253 0	46 0	20 8	1	2700	Trieste	1872	..	..	..	15 5·9-in. (Krupp), 7 Q.F. & M., 2 l.	..	14·0	450	497
cr. 3rd cl.	Saida	C.	2500	233 4	42 8	19 1	1	1800	Pola	1878	..	..	..	11 5·9-in. (Uchatius), 1 l.	..	12·0	320	299
to. g. b.	Satellit	S.	540	220 6	26 9	9 2	2	4000	..	1893	..	..	1½	9 Q.F.	..	21·87	..	61
to. g. b.	Sebenico	S.	900	187 0	26 3	12 2	2	1380	Pola	1882	..	..	..	7 Q.F., 5 l.	..	14·0	200	142
cr. 3rd cl.	Spalato	S.	850	179 6	26 3	12 2	2	1200	Trieste	1879	..	..	..	7 Q.F., 5 l.	..	14·0	150	142
to. cr.	Tiger	S.	1684	233 0	32 10	15 5	2	5260	Trieste	1887	..	..	..	4 4·7-in., 10 Q.F.	..	18·0	300	190
to. g. b.	Trabant	S.	530	210 0	23 0	8 3	2	3500	Trieste	1890	..	..	..	10 Q.F.	1	20·0	..	61
to. v.	Zara (Schoolship)	S.	850	179 6	26 3	12 2	2	1200	Pola	1879	..	..	..	7 Q.F., 5 l.	..	14·0	150	142
corv.	Zrinyi	C.	1370	190 6	32 10	16 1	1	1000	Trieste	1871	..	..	..	2 5·9-in. (Wahrendorf), 5 l., 2 M. or Q.F.	..	11·0	160	209

Four screw gunboats, between 540 and 870 tons displacement and 250 and 950 indicated horse-power.

BRAZIL.—Armoured Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position.	Armour. Backing. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.				£	inches.	inches.	inches.			knots.	tons.	
t. River	Alagoãs .	W.	340	120 0	28 0	4 10	2	180	Brazil .	1886	..	4½	4½	14½	1 7-in. M.L.R. (Whitworth), 2 M. .	..	7·0	..	43
c.d.s., t.	Bahia .	I.	1000	178 0	35 0	8 6	2	1640	Birkenhead .	1865	..	4½	5½	10⅝	2 7-in. M.L.R. (Whitworth), 2 M. .	..	6·0	..	125
t. River	Maranhao .	S.	470	137 0	34 7	6 5	2	700	Brazil .	Bldg.	..	5 H.S.	..	..	2 4.7-in. Q.F.	..	12·0	..	..
c.d s., t. c.d.s., t.	Marshal Deodoro . Marshal Floriano .	S.	3162	267 6	48 0	13 2	2	3400	La Seyne .	Bldg.	..	13¾ H.S.	7¾-8¾ H.S.	1½	2 9·4-in., 2 5·9-in. howitzers, 4 4·7-in. Q.F., 2 M., 4 6-pr. and 2 1-pr.	2 (sub.)	15·0	236	200
t. River	Pernambuco .	S.	470	137 0	34 7	6 5	2	700	Brazil .	Bldg.	..	5 H.S.	..	..	2 4·7-in. Q.F.	..	12·0	..	..
t. River	Piauhy . .	W.	340	120 0	28 0	4 10	2	180	Brazil .	1887	..	4½	4½	14½	1 7-in. M.L.R. (Whitworth) . .	..	7·0	..	43
t.	Riachuelo .	S. shd.	5700	305 0	52 0	19 6	2	7300	Poplar .	1883 R. 1895	365,000*	11 comp.	11 & 10 comp.	10 2″	4 9·2-in. (Whitworth, altered by Armstrong), 6 4·7-in., Q.F., 2 3-pr., 15 M.	5	16·71	800	450
t. River	Rio Grande .	W.	340	120 0	28 0	4 10	2	180	Brazil .	1888	..	4½	4½	14½	1 7-in. M.L.R. (Whitworth) . .	..	7·0	..	43
t.	24 de Maio (ex Aquidaban)	S shd.	4950	280 0	52 0	18 0	2	6200	Poplar .	1885 R. 1897	345,000*	11	11½ & 10 cp.	10 2″	4 9·4-in. (Canet), 4 5 5-in., 2 Q.F., 13 M.	5	15·0	600	350

* Exclusive of guns and ammunition.

BRAZIL.—Cruising Ships, &c.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.†	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.					inches.	inches.			knots.	tons.	
cr.	Almirante Tamandare.	S. shd.	4735	294 0	46 0	18 4	2	7500	Brazil	1890	..	..	1½	10 6-in. Q.F., 2 4·7-in., 8 M.	8	17·0	750	450
„	Andrada (ex America)	S. shd.	2600	252 8	34 0	18 0	1	3600	..	1890	..	..	..	2 4·7-in. 2 14-pr. Q.F., 6 6-pr., 6 1-pr.	5	17·0	..	..
cr.	Amazonas / Barrozo / New cruiser	S. shd.	3600	330 0	43 9	16 10	2	7500	Elswick	1896 / 1896 / Bldg.	..	4½	3	6 6-in. Q.F., 4 4·7-in., 10 6-pr., 4 1-pr., 4 M.	3	20·0	700	..
„	Benjamin Constant	S, shd.	2750	236 0	46 0	18 0	1	2800	La Seyne	1892	..	..	2	4 6-in. Q.F., 8 4·7-in., 8 M., 4 l..	4	14·0	260	287
to.cr.	Caramuru	S.	1030	259 2	30 9	10 2	2	6000	Kiel	1896	..	..	..	2 4-in. Q.F., 6 2·2-in., 4 1·4-in.	3	22·0	..	..
to.g.b.	Gustavo Sampaio	S.W.	500	197 0	21 0	7 9	2	2500	..	1893	..	..	..	2 20-pr. Q.F., 4 7-pr. Q.F.	3	18·0	150	95
..	Nictheroy (ex El Cid)	C.	7080	400 0	48 0	22 0	..	4,000*	New York	1893	..	..	..	1 4·7-in. Q.F., 2 3·9-in., 8 6-pr., 10 3-pr.	3	19 0	..	..
„	Parnahyba (Torpedo training.)	C.	838	170 6	26 3	11 2	1	900	Havre	1878	..	..	..	5 4·7-in., 4 M.	..	10·0	..	..
„	Paysandu (ex Guanabára)	W.	1900	200 0	41 2	16 4	1	3000	Brazil	1877	..	..	..	9 70-pr. M.L.R. (Whitworth), 6 M., 2 l.	..	13·0	..	250
cr.	Primeiro de Março	C.	726	167 3	26 3	10 6	1	750	Brazil	1881	..	..	...	7 4·5-in. M.L.R. (Whitworth), 4 M.	..	9·0	..	..
„	Quinze de Novembro (ex Republica)	S.	1300	210 0	35 0	13 0	2	3300	Elswick	1892	..	..	2–1	6 4·7-in. Q.F., 4 6-pr., 6 M.	4	17·0	170	160
to.cr.	Timbira	S.	1030	259 2	30 9	10 2	2	6000	Kiel	1896	..	..	..	2 4-in. Q.F., 6 2·2-in.. 4 1·4-in.	3	22·0	..	..
g.v.	Tiradentes	S. shd.	800	165 0	30 0	11 0	2	1200	Elswick	1892	..	..	..	4 4·7-in. Q.F., 3 6-pr., 4 M.	2	14·5	110	107
cr.	Tonelero (ex Trajano)	W.	1414	200 0	30 0	15 6	2	2400	Brazil	1873 / 1895	..	..	..	7 4·7-in. Q.F., 4 M..	..	13·0	..	..
„	Trinidade (ex Liberdade)	I.	250	101 8	21 8	10 10	2	280	Brazil	1884	..	..	..	2 l., 1 M.	..	10·0	..	..
to.cr.	Tupy	S.	1030	259 2	30 9	10 2	2	6000	Kiel	1896	..	..	..	2 4-in. Q.F., 6 2·2-in., 4 1·4-in.	3	22·0	..	..

* Doubtful. † All the Q.F. guns above 6-pr. in Brazilian Navy are Armstrong.

CHILI.—Armoured Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position.	Armour. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.*	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.				£	inches.	inches.	inches.			knots.	tons.	
c.b.	Almirante Cochrane	I.	3500	210 0	45 9	19 8	2	2920	Hull	1874	..	9	8	3″	6 8-in. (Armstrong), 4 6-pr. Q.F., 4 3-pr., 7 M.	3	13·0	500	242
b.	Capitan Prat	S. shd.	6900	328 0	60 8	21 10	2	12,000	La Seyne	1890	391,000	12 steel Schn.	10½ 4	3″	6 9·4-in. (Canet), 8 4·7-in. Q.F. (Canet), 6 57-mm., 4 47-mm., 10 37-mm., 5 M.	4	18·3	400 1100	485
a.c.	Esmeralda	S. shd.	7020	436 0	53 2	22 3	2	18,000	Elswick	1896	..	6 H.S.		2	2 8-in. Q.F., 16 6-in., 8 12-pr., 10 6-pr., 4 M.	3	23·0	550* 1350	..
t.	Huascar	I.	1800	200 0	35 0	15 6	1	1050	Birkenhead	1865	..	4½	5½ t	1½″	2 8-in. (Armstrong), 2 4·7-in. Q.F., 3 M., 4 l.	..	12·0	250	134
,,	O'Higgins	S. shd.	8500	411 9	62 6	..	2	16,500	Elswick	Bldg.	..	7	..	2	4 8-in. Q.F., 10 6-in., 4 4·7-in., 10 12-pr., 10 6-pr., 4 M.	3 (2 sub)	21·25	..	..

* Bunker capacity

Cruising Ships, &c.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.					inches.	inches.			knots.	tons.	
to.g.b. / to.g.b.	Almirante Condell / Almirante Lynch	S.	750	240 0	27 6	10 6	2	4500	Birkenhead	1890	..	..	..	3 14-pr. Q.F., 4 3-pr., 2 M.	5	21·0	100	..
to.g.b	Almirante Molinas	S.	1200	295 3	32 6	12 10	2	6000	..	Bldg.	..	..	..	4 4·7 Q.F., 6 1·8-in., 4 1·4-in., 2 M.	4	22·0	1200	..
,,	Almirante Simpson	S.	812	240 0	27 6	10 6	2	4500	Birkenhead	1896	..	4½	..	2 4·7 Q.F., 4 3-pr.	3	21·5t	100	..
cr.	Blanco Encalada	S.	4400	370 0	46 6	18 6	2	14,500	Elswick	1893	..		4–1¾	2 8-in., 10 6-in. Q.F., 12 3-pr., 12 1-pr.*	5	22·78	900	..
gr.	Magellanes	C.	800	190 0	28 0	14 9	2	1230	London	1874	..	..	..	2 6-in., 1 7-in. M.L.R., 6 M., 2 l.	..	11·0	300	100
cr.	Ministro Zenteno	S.	3600	330 3	43 9	16 10	2	..	Elswick	1896	..	..	..	8 6-in. Q.F., 10 6-pr., 4 1-pr.*	3	20·0	..	..
gr.	Pilcomayo	W.	790	171 0	27 4	..	1	180 (nom.)	Birkenhead	1874	..	..	..	2 70-pr. B.L.R. (Armstrong), 2 40-pr., 3 M.	..	9·0	125	125
cr. / ,,	Presidente Errázuriz / Presidente Pinto	S. shd.	2080	268 0	35 9	19 6	2	5400	La Seyne	1890	..	..	3½	4 6-in. Q.F. (Canet), 2 5-in., 4 2·2-in., 6 M.	3	19·0	200	171

Five Gunboats of 420 tons displacement and 7 to 10 knots speed.

* Armstrong.

CHINA.—Cruising Ships, &c.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement
			tons.	ft. in.	ft. in.	ft. in.	no.					inches.	inches			knots.	tons.	
cr.	Foo-Ching . . .	S.	2500	253 0	36 2	18 0	2	2400	..	1893	..	4½	4–2	3 5-in. Krupp, 4 M., 2 l. . .	..	16·0	..	..
to g.b.	Fei-Ting . . .	S.	850	257 2	28 6	12 6	2	5000	Elswick	1895	..	3	..	2 4-in. Armstrong Q.-F., 4 1·9-in., 4 1·4-in. Hotchkiss.	3	22.0	75	90
„	Hi-Ying . . .	S.	2200	253 0	36 2	18 1	2	2400	..	1895	..	..	..	2 8-in. Armstrong, 8 4·7-in. Q.F., 4 M.	1	21·0	..	..
„	Huan-Tái . . .	C.	2110	260 0	36 0	20 0	1	1600	...	1886	..	..	..	3 7-in. Krupp, 7 40-pr., 4 M. .	2	15·0	360	..
„	Kai-Chih . . .	C.	2110	260 0	36 0	20 0	1	1600	..	1882	..	..	..	2 8 2-in., 6 5 9-in, 6 M., 5 l. .	..	15·0	360	..
„	King-Ching . . .	C.	2100	250 0	36 0	20 0	1	2400	..	1886	..	..	..	3 7-in. Krupp, 7 40-pr., 6 M. .	2	14·5	360	..
„	Kwang Ting . . .	C.	1000	235 0	27 6	11 4	2	3400	..	1890	..	·22	1	3 4 7-in. Q.F., 4 M., 2 l. .	4	16·5	..	..
„	Nan-Schuin . . .	S.	2200	253 0	36 2	18 1	2	2400	Kiel.	1884	..	..	..	2 8-in. Armstrong, 8 4·7-in. Q.F., 4 M.	1	14·5	600	..
„	Nan-Thin . . .	S.	2200	253 0	36 2	18 1	1	2400	Kiel.	1883	..	..	..	2 8-in. Armstrong, 8 4·7-in. Q.F., 4 M.	1	15·0	600	..
..	Pao Min . . .	S.	1480	213 0	36 0	14 0	1	2400	..	1883	..	..	..	2 6-in. Armstrong, 6 5-in., 2 1	..	9	300	..
g.b.	Tien Sing . . .	W.	200	105 0	20 4	7 0	2	340	..	1875	..	3	..	1 7-in. (Krupp) . . .	..	10·0	..	..
cr.	Three unnamed. . .	S.	2950	328 0	41 0	16 6	2	8000	Vulcan, Stettin.	Bldg.	..	2	2½	3 6-in. Q.-F., 8 4-in., 6 1·4-in., Hotchkiss, 6 M.	3	19·5	220	250
cr.	Two unnamed . . .	S.	4500	40 0	47 0	18 6	..	..	Elswick.	Bldg.	..	..	..	2 8-in. Q.F., 10 4·7-in., 16 3-pd.	5	24·0	1200*	..

An 1800-ton cruiser was launched at Foochow in 1896.

* Bunker capacity.

DENMARK.—Armoured Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Maximum Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position.	Armour. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	inches.	inches.	inches.			knots.	tons.	
c.d.s.,t.	Gorm . . .	I.	2344	231	0	40	0	14	0	2	1670	Copenhagen	1870	104,000	7	8	..	2 10-in. (Armstrong) M.L.R., 3 3·4-in. (Krupp), 4 M.	..	12·25	115	158
t.	Helgoland . .	I.	5347	257	6	59	2	18	8	2	4000	Copenhagen	1878	275,000	12	10	4	1 12-in. (Krupp), 4 10·2-in., 5 4·7-in., 10 M.	4	12·0	230	350
c.d.s,t.	Herluf Tralle .	S.	5000	..		..		..		2	..	Copenhagen	Bldg.	..	..	..	..	..	..	..	..	..
b.	Iver Hvitfeldt .	S.	3260	242	0	49	6	18	0	2	5100	Copenhagen	1886	200,000	12	8	2	2 10·2-in. (Krupp), 4 4·7-in., 12 M.	4	15·6	250	298
c.d.s.,t.	Lindormen.	I.	2076	216	0	39	5	13	9	2	1560	Copenhagen	{1868 Pro.}	93,000	5	5	..	2 9-in. (Armstrong) M.L.R., 3 3·4-in. (Krupp), 4 M.	..	12·0	120	140
c.d.s.,t.	Unnamed . .																					
c.b.	Odin . . .	I.	3083	237	0	50	0	15	6	1	2260	Copenhagen	1872	147,000	8	8	..	4 10-in. (Armstrong) M.L.R., 4 3·4-in. (Krupp), 7 M.	..	12·4	180	236
t.	Skjold . .	S.	2150	226	6	38	0	13	5	2	2200	Copenhagen	1896	..	9	8-4½	2	1 9·4-in., 3 4·7-in. (Krupp), 4 1·8-in. Q.F., 1 M.	4	13·0	..	..
T. S.	Tordenskiold .	S.	2400	221	6	43	3	15	6	2	2600	Copenhagen	1880	138,900	..	8	4–2	1 14-in. (Krupp), 4 4·7-in., 8 M.	4	14·0	170	220

Esbern Snare (torpedo school-ship), 530 tons, 2-in. belt. Repaired 1895–6.

DENMARK.—Cruising Ships, &c.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour: Gun Position.	Armour: Deck.	Armament: Guns.	Armament: Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft. in.	ft. in.	ft. in.	no.				£	inches.	inches.			knots.	tons.	
g. v.	Absalon	I.	527	150 0	26 0	10 2	1	500	Blackwall	1862	..	2½	2½	4 3·4-in. (Krupp), 4 M.	..	10·0	65	70
„	Diana	W.	556	154 6	26 3	10 2	1	500	Copenhagen	1863	33,000	..	..	6 3·4-in. (Krupp), 2 M.	..	9·0	60	81
„	Falster	I.	356	111 0	28 10	7 6	2	510	Copenhagen	1873	33,000	..	..	1 10-in. (Armstrong) M.L.R., 2 3·4-in. (Krupp), 2 M.	..	9·8	20	35
cr.	Fyen	S. shd.	2596	226 6	45 6	18 1	1	2700	Copenhagen	1882	170,000	..	1½	18 5·9-in. (Krupp), 8 M.	2	13·0	290	407
3rd cl. *cr.*	Geiser	S.	1280	257 6	27 6	11 4	2	3000	Copenhagen	1892	..	..	1½	2 4·7-in. Q.F., 4 3·4-in., 6 M.	4	17·1	..	..
„	Heimdal	S.	1280	257 6	27 6	11 4	2	3000	Copenhagen	1894	..	..	1½	2 4·7-in. Q.F., 4 3-pr., 6 M.	4	17·5	..	..
„	Hekla	S.	1280	233 0	32 10	11 2	2	3000	Copenhagen	1890	..	..	1½	2 6-in. Q.F., 4 2·2-in., 6 M.	4	17·0	..	..
g. v.	Ingolf	I.	870	192 0	28 0	12 6	1	600	Copenhagen	1876	44,000	..	..	2 5·9-in. (Krupp), 4 3·4-in., 2 M.	..	10·5	130	117
g. v.	Möen	I.	356	111 0	28 10	7 6	1	523	Copenhagen	1875	..	..	..	1 10-in. (Armstrong) M.L.R., 2 3·4-in. (Krupp), 2 M.	..	9·2	20	35
corv.	Saint Thomas	W.	1572	224 0	33 0	17 0	1	1870	Copenhagen	1871	..	..	..	8 4·7-in. (Krupp), 6 M.	..	13·0	190	182
cr.	Valkyrien	S.	2900	268 0	43 6	18 0	2	5300	Copenhagen	1887 1896	..	..	2½	2 8·2-in. (Krupp), 6 5·9-in., 4 Q.F., 10 M.	5	17·0	450	300

Gunboats.—Five in number (*Lille Belt*, *Öresund*, *Store Belt*, *Grönsund*, *Guldborgsund*), of 150 to 240 tons, 200 to 400 I.HP.
Dagmar (training-ship), corvette, 1200 tons; *Hjaelperen* (mining), 280 tons; *Sleipnir* (ice-breaker), 1260 tons, 3000 I.H.P.

FRANCE.—Armoured Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Maximum Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour.			Armament.		Speed.	Normal Coal Supply.	Complement.
															Belt.	Gun Position.	Deck Plating.	Guns.	Torpedo Tubes.			
			metric tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	inches.	inches.	inches.			knots.	tons.	
a.g.b.	**Achéron** .	. I. & S.	1721	181	0	40	4	11	10	2	1700	Cherbourg .	1885	100,000	8	8	2½	1 10·6-in., 3 3·9-in. Q.F., 2 1·8-in., 4 M.	..	13·0	100	101
b.	**Amiral Baudin**	I. & S.	11,911	321	6	69	10	26	2	2	8320	Brest . .	1883	600,000	21½	16½	4	3 14·5-in., 4 6·2-in. Q.F., 8 5·5-in., 9 1·8-in., 14 M.	6	15·0	800	630
a.c.t.	**Amiral Charner**	S.	4792	348	0	46	0	19	2	2	8300	Rochefort .	1893	353,200	3½	2	2	2 7·4-in., 2 5·5-in. Q.F., 4 2·5-in., 6 1·8-in., 6 1·4-in., M.	5	18·2	413	375
b.	**Amiral Duperré**	I. & S.	11,209	311	0	66	11	26	9	2	8120	La Seyne .	1879	570,000	21½	15½	2¼	4 13·3-in., 1 6·2-in., 14 5·5-in., 11 Q.F., 18 M.	4	14·22	850	664
a.c.t.	**Amiral Pothuau**	S.	5360	370	6	50	2	21	0	2	10,398 *t*	Havre . .	1895	384,000	3⅛–2	9½	3⅜	2 7·4-in., 10 5·5-in. Q.F., 16 1·8-in., 8 1·4-in.	5	19·2*t*	538	461
t.	**Amiral Tréhouart**	S.	6629	293	2	58	4	23	2	2	8500	Lorient .	1893	593,100	17¾	14½	4	2 12-in., 8 3·9-in. Q.F., 4 1·8-in. Q.F., 4 1·4-in., 8 M.	2	15·76 *t*	300	337
a.c.	**Bayard** . .	W.	6011	265	9	57	2	24	11	2	4538	Brest . .	1880	..	10	8	2	4 9·4-in., 2 7·4 in., 6 5·5-in., 2 2·5-in., 12 M.	2	14·0	500	450
t.	**Bouvet** . .	S.	12,200	401	2	70	3	27	6	3	14,000	Lorient .	1896	1,100,770	15¾–8 N.S.	14½ N.S.	3½ N.S.	2 12-in., 2 10·6-in., 8 5·5-in. Q.F., 8 3·9-in., 12 1·8-in., 20 1·4-in.	4	17·5	621	631
t.	**Bouvines** .	S.	6610	293	9	58	3	23	3	2	8400	La Seyne .	1892	594,640	17¾	14½	4	2 12-in., 8 3·9-in. Q.F., 4 1·8-in., 10 1·4-in. M.	2	16·05	300	323
t.	**Brennus** . .	S.	11,395	361	0	67	0	26	3	2	14,000	Lorient .	1891	991,767	15¾ comp.	15¾	4¾	3 13·3-in., 10 6·2-in. Q.F., 4 2·5-in., 8 1·8-in., 8 M.	4	17·1	800	696
a.c.t.	**Bruix** . .	S.	4754	365	3	46	0	19	10	2	9049*t*	Rochefort .	1894	409,622	3¾	3¾	2	2 7·5-in., 6 5·5-in. Q.F., 4 2·5-in., 4 1·8-in., 6 1·4-in., M.	4	18·3*t*	406	391
b.	**Caïman** .	. I. & S.	7639	278	3	59	0	24	7	2	6000	Toulon .	1885	..	19½	17¾	3	2 16·5-in., 4 3·9-in. Q.F., 2 1·8-in., 16 M.	4	14·5	400	332

t.	**Carnot** * .	S.	12,008	382	2	70	6	27	3	2	16,300 t	Toulon .	1894	1,070,088	17¾ 10¾	14½	2¾	2 12-in., 2 10·6-in., 8 5·5-in. Q.F., 4 2·5-in., 16 1·8-in., 10 1·4-in.	4 (2 sub.)	17·86 t	705	625
a.c.t.	**Chanzy** .	S.	4933	348	0	46	0	19	2	2	8300	Bordeaux .	1894	360,000	3¾	2	2	2 7·4-in., 6 5·5-in. Q.F., 4 2·5-in., 6 1·8-in., 6 1·4-in., M.	4	19·0	413	375
b.	**Charlemagne** .	S.	11,275	385	6	66	6	27	6	3	14,500	Brest .	1895	1,096,432	15.7	15¾	3½	4 12-in., 10 5·5-in. Q.F., 8 3·9-in., 16 1·8-in., 10 1.4-in., 8 M.	4	18·0	680‡	631
t.	**Charles Martel**.	S.	11,880	392	6	71	0	27	6	2	13,500	Brest .	1893	1,092,830	17¾	15¾	3½	2 12-in., 2 10·6-in., 8 5·5-in. Q.F., 4 2·5-in., 14 1·8-in., 5 1·4-in.	6	18·0*t*	677	632
a.g.b.	**Cocyte** .	I. & S.	1714	181	10	40	4	11	10	2	1700	Cherbourg .	1887	100,000	8	8	2½	1 10·6-in., 2 3·9-in. Q.F., 2 1·8-in., 4 M.	..	13·0	100	101
c.b.	**Colbert**. .	W.	8924	317	9	56	6	28	5	1	4652	Brest .	1875	..	8½	6¼	..	8 10·6-in., 2 9·4-in., 6 5·5-in., 2 Q.F., 14 M.	4	14·47	700	706
c.b.&b.	**Courbet** .	I. & S.	10,808	312	0	67	0	25	0	2	8100	Toulon .	1881	800,000	15	9½	2½	4 12·5-in., 4 10·6-in., 6 5·5-in., 2 Q.F., 18 M.	5	15·4	900	669
c.b.&b.	**Dévastation** .	I. & S.	10,704	312	0	67	0	25	0	2	8320	Lorient .	1879	..	15	9½	2½	4 12·5-in., 4 10·6-in., 6 5·5-in., 2 Q.F., 18 M.	4	15·17	950	685
a.c.b.	**Duguesclin** .	S. shd.	6210	266	0	57	0	25	3	2	3300	Rochefort .	1883	220,000	9	8 comp.	2	4 9·4-in., 1 7·4-in., 6 5·5-in., 1 3·5-in. Q.F., 10 M.	2	14·0	400	430
a.c.	**Dupuy de Lôme**	S.	6406	374	0	51	6	23	6	3	14,000	Brest .	1890	416,000	4	4	2	2 7·4-in., 6 6·2-in. Q.F., 12 2·5-in., 1·8-in., 8 M.	4	20·0	900	515
a.g.b.	**Flamme** .	S.	1128	165	0	32	7	10	4	2	1500	Cherbourg .	1885	68,000	10	4-in.	2	1 9·4-in., 1 3·5-in., 4 M.	1	13·0	120	84
b.	**Formidable** † .	S.	12,165	321	6	69	6	26	2	2	9700	Lorient .	1885	467,520	21½	17¾	3	2 14·6-in., 8 6·3-in. Q.F., 8 5·5-in., 9 1·8-in., 14 M.	6	16·2	1200	640
c.b. & b.	**Friedland** .	I.	8994	317	0	58	0	29	11	1	4428	Lorient .	1873	..	8	7	..	8 10·6-in., 8 5·5-in., 20 M. .	4	13·3	800	676
c.d.s., t.	**Fulminant**	I. & S.	5965	248	0	57	9	21	4	1	4500	Cherbourg .	1877	..	13	12	2	2 10·6-in., 4 1·8-in. Q.F., 6 M.	2	13·8	400	248
c.d.s., b.	**Furieux** .	I. & S.	6019	247	10	59	0	21	9	2	5033	Cherbourg .	1883	264,640	20	17¾	3½	2 13·3-in., 5 Q.F., 10 M. .	2	14·0	290	248
a.g.b.	**Fusée** .	S. shd.	1142	165	0	32	7	10	4	2	1500	Lorient .	1884	68,000	10	4	2	1 9·4-in., 1 3·5-in., 4 M. .	1	13·0	120	84

* Is having her aftermast removed. † Has received new boilers. ‡ Also liquid fuel.

FRANCE.—Armoured Ships—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position.	Armour. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft. in.	ft. in.	ft. in.					£	inches.	in ches.	inches.			knots.	tons.	
b.	**Gaulois**	S.	11,275	385 6	66 6	27 6	3	14,500	Brest	1896	1,093,925	15¾	15¾	3½–1¼	4 12-in., 10 5·5-in. Q.F., 8 3·9-in., 16 1·8-in., 10 1·4-in., 8 M.	6	18·0	680‡	632
a.g.b.	**Grenade**	S. shd.	1089	165 0	32 7	10 4	2	1500	Lorient	1888	68,000	10	4	2	1 9·4-in., 1 3·5-in., 4 M.	1	13·0	120	84
c.d.s.,t.	**Henri IV. A 3***	S.	8948	354 3	72 10	23 0	3	11,500	Cherbourg. Brest.	Bldg. Pro.	800,000	(?)	(?)	(?)	2 10·6-in., 7 5·5-in. Q.F., 12 1·8-in. Q.F., 2 M.	2 (sub.)	17	725 1100	(?)
t. & b.	**Hoche**	I. & S.	10,997	333 0	65 7	27 3	2	11,300	Lorient	1886	700,000	18	16	3	2 13·3-in., 2 10·6-in., 8 5·5-in., Q.F., 8 Q.F., 12 M.	5	16·0	800	660
b.	**Indomptable †**	I. & S.	7634	279 10	59 0	23 6	2	6605	Lorient	1883	..	20	17½	3	2 16·5-in., 4 3·9-in. Q.F., 2 1·8-in., 16 M.	4	14·8	400	332
t.	**Jauréguiberry**	S.	11,824	364 0	72 10	27 9	2	15,800	La Seyne	1893	1,069,536	17¾	14½	2¾	2 12-in., 2 10·6-in., 8 5·5-in. Q.F., 4 2·5-in., 12 1·8-in., 8 1·4-in., 8 M.	6	18·07	700	625
a.c.	**Jeanne d'Arc C 3**	S.	11,270	469 2	63 8	26 7	3	28,000	Toulon	Bldg. Pro.	882,955 ..	6–3 H.S.	(?)	2·2 H.S.	2 7·4-in., 8 5·5-in. Q.F., 12 3·9-in., 16 1·8-in., 8 1·4-in., 2 M.	2	23	1400	626
c.d.s.,t.	**Jemmapes**	S.	6592	284 0	57 8	22 0	2	9250	St. Nazaire	1892	525,000	17¾–10	17¾	4–2¾	2 13 3-in., 4 3·9-in. Q.F., 4 1·8-in. Q.F., 10 1·4-in. M.	2	16·7	300	334
a.c.	**Latouche Tréville**	S.	4756	348 0	46 0	19 2	2	8300	Havre	1892	360,000	3⅝	3⅝	2–1½	2 7·4-in., 6 5·5-in. Q.F., 4 2·5-in., 4 1·8-in., 6 1·4-in. M.	4	18·2	406	375
b.	**Magenta**	I. & S.	10,851	330 0	65 7	27 3	2	12,000	Toulon	1890	760,960	18	16	3	4 13·3-in., 17 5·5-in. Q.F., 4 2·5-in., 12 1·8-in., 8 M.	3	16·25	800	660
b.	**Marceau**	I. & S.	10,850	330 0	65 7	27 3	2	12,000	La Seyne	1887	769,080	18	16	3	4 12·5-in., 17 5·5-in. Q.F., 4 2·5-in. and 12 1·8-in., 8 M.	6	16·4	800	660
t.	**Masséna**	S.	11,924	384 10	66 0	27 0	3	13,500	St. Nazaire	1895	1,100,400	17¾–9¾	15¼ 15¾ H. S.	3½ H. S.	2 12-in., 2 10·6-in., 8 5·5-in. Q.F., 8 3·9-in., 12 1·8-in. and 12 1·4-in.	6	17·5	630	642
a.g.b.	**Mitraille**	S. shd.	1128	165 0	32 7	10 4	2	1500	Rochefort	1886	70,000	10	4	2	1 9·4-in., 1 3·5-in., 4 M.	..	13·0	120	84
b.	**Neptune**	I. & S.	10,983	330 0	65 7	27 3	2	12,000	Brest	1887	780,000	18	16	3	4 12·5-in., 17 5·5-in. Q.F., 4 2·5-in. and 12 1·8-in., 8 M.	5	16·02	800	660
c.d.s.	**Onondaga §**	I.	2593	226 6	49 3	16 0	2	642	New York	1863	..	5½	11¾	1	4 9·4-in., 4 M.	..	6·5	200	100
a.g.b.	**Phlégéton**	I. & S.	1796	187 0	40 4	11 10	2	1700	Cherbourg	1890	142,000	9	8	2	1 10·6-in., 1 5·5-in. Q.F., 4 1·8-in., 4 M.	..	12·4	72	101
c.b. & b.	**Redoutable**	I. & S.	9437	318 2	64 8	25 6	2	6071	Lorient	1876 1894	..	14	9½	2½	8 10·6-in., 6 5·5-in., Q.F. 2 Q.F., 12 M.	4	14·66	1000	700
b.	**Requin**	I. & S.	7822	279 10	59 0	24 7	2	6000	Bordeaux	1885	..	19½	17¾	3	2 13·3-in., 4 3·9-in. Q.F., 2 1·8-in., 16 M.	4	15·0	400	332
c.b. & b.	**Richelieu**	W.	9128	323 6	57 10	27 11	2	4240	Toulon	1873	..	8½	6¼	..	6 10·6-in., 5 9·4-in., 8 5·5-in., 18 M.	4	13·11	900	720
t.	**Saint Louis**	S.	11,275	385 6	66 6	27 6	3	14,500	Lorient	1896	1,080,997	15¾ H.S.	3–15¾ H.S.	3½ H.S.	4 12-in., 10 5·5-in. Q.F., 8 3·9-in., 16 1·8-in., 10 1·4-in., 8 M.	4	18·0	680	631
a.g.b.	**Styx**	I. & S.	1796	187 0	40 4	11 10	2	1700	Cherbourg	1892	142,000	9	8	2	1 10·6-in., 1 5·5-in. Q.F., 4 1·8-in., 4 M.	..	13·0	72	101
c.b.& b.	**Suffren**	W.	7925	282 6	57 10	29 10	1	4288	Cherbourg	1870	..	8	6¼	..	4 10·6-in., 4 9·4-in., 6 5·5-in. 3-ton, 12 M.	4	14·3	700	675
c.d.s., t.	**Tempête**	I. & S.	4869	248 0	57 9	16 9	1	2193	Brest	1876	..	13	12	2	2 10·6-in., 4 1·8-in. Q.F., 6 M.	2	11·7	200	197
b.	**Terrible**	I. & S.	7575	279 10	59 0	24 7	2	6230	Brest	1881	..	19½	17¾	3	2 16·5-in., 4 3·9-in. Q.F., 2 1·8-in., 16 M.	4	14·5	400	332
c.d.s., b.	**Tonnant**	I. & S.	5091	248 7	58 5	17 3	1	1935	Rochefort	1880	..	18	14½	3	2 12·5-in., 4 M.	..	11 5	200	197

* Particulars doubtful. † Is receiving new boilers and part new armament. ‡ Also liquid fuel. § Repaired and refitted as central ship of coast defence service at St. Malo.

FRANCE.—Armoured Ships—*continued.*

Class.	NAME.	Material.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position.	Armour. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft. in.	ft. in.	ft. in.					£	inches.	inches.	inches.			knots.	tons.	
c.d.s., t.	Tonnerre .	. I. & S.	5858	248 0	57 9	21 4	1	4165	Toulon	. 1875	..	13	12	2	2 10·6-in., 4 1·8-in. Q.F., 6 M.	2	14·01	400	249
c.b. & b.	Trident .	. W.	8857	317 9	56 4	29 1	1	5083	Toulon	. 1876	..	8½	6¼	½	8 10·6-in., 2 9·4-in., 6 5·5-in. 2 Q.F., 14 M.	6	14·17	650	730
a.c.	Turenne .	. W.	6349	265 9	57 2	23 11	2	4160	Lorient	. 1879	..	10	8	2	4 9·4-in., 2 7·4-in., 6 5·5-in., 12 M.	2	14·14	500	450
c.d.s., t.	Valmy .	. S.	6592	293 9	57 4	23 3	2	8954	St. Nazaire	. 1892	578,957	17¾	17¾	4	2 12·5-in., 4 3·9-in. Q.F., 4 1·8-in. 10 M.	2	16·7	300	297
a.c.	Vauban .	. S.	6208	267 9	57 3	24 0	2	4560	Cherbourg	. 1882	..	10	8	2	4 9·4-in., 1 7·4-in., 6 5·5-in., 12 M.	2	14·32	550	440
d.s., t.	Vengeur .	. I. & S.	4709	248 0	57 9	16 9	2	2030	Cherbourg	. 1878	..	13	12	2	2 12·5-in., 4 1·8-in. Q.F., 6 M.	2	10·83	200	107

FRANCE.—Cruising Ships, &c.

Class.	NAME.	Material.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft. in.	ft. in.	ft. in.	no.				£	in.	in.			knots.	tons.	
2nd cl. *cr.*	**Alger**	S.	4382	346 0	45 3	19 6	2	8254	Cherbourg	1889	280,000	..	3½	4 6·2-in. Q.F., 6 5·5-in., 10 other Q.F., 10 M.	4	19·61	860	325
g. v.	**Amiral Parseval**	W. & I.	869	197 6	28 0	12 2	1	918	Rochefort	1879	33,772	..	..	4 5·5-in., 4 M.	..	12·33	150	116
3rd cl. *cr.*	**Amiral Rigault de Genouilly.**	W.	1756	236 3	35 5	17 0	1	2043	Brest	1876	62,796	..	..	8 5·5-in., 8 M.	..	14·49	200	198
2nd cl. *cr.*	**Aréthuse**	W.	3665	277 6	43 6	21 9	1	4200	Toulon	1882	..	..	..	4 6·2-in., 22 5·5-in., 8 M.	..	14·0	500	474
g. v.	**Aspic**	C.	476	145 4	23 10	10 6	1	453	Rochefort	1880	..	..	..	2 5·5-in., 2 3·9-in.	..	10·3	50	80
to. g. b.	**Bombe**	S.	420	196 10	21 7	5 11	2	2000	Havre	1885	..	..	..	4 1·8-in. Q.F., 3 M.	2	18·0	100	63
2nd. cl. *cr.*	**Bugeaud**	S.	3740	308 6	43 6	20 6	2	9000	Cherbourg	1893	308,650	2 shield	3	6 6·2-in. Q.F., 4 3·9-in., 8 1·8-in., 11 1·4-in.	6	18·9 *t*	587	358
g. v.	**Capricorne**	W.	483	148 4	23 10	10 5	1	443	Havre	1882	..	..	..	2 5·5-in., 2 3·9-in.	..	11·18	70	80
to. g. b.	**Casabianca**	S.	960	262 6	26 10	11 6	2	5200 *t*	Bordeaux	1895	98,985	..	½	1 3·9-in. Q.F., 3 2·5-in. 5 1·8-in. 4 1·4-in.	..	22·0 *t*	116	143
2nd. cl. *cr.*	**Cassard**	S.	3952	325 6	44 11	20 6	2	9500	Cherbourg	1896	318,712	2 shield	2½	6 6·2-in., Q.F., 4 3·9-in., 10 1·8-in., 11 1·4-in.	2	19·25	630	385
to. g. b.	**Cassini**	S.	958	262 6	27 4	11 6	2	5500 *t*	Bordeaux	1894	98,500	..	½	1 7-in. Q.F., 3 2·5-in. 4 1·4-in.	2	21·2 *t*	110	118
2nd. cl. *cr.*	**Catinat**	S. Shd.	4065	331 10	44 8	21 1	2	9000	Havre	1896	324,992	2 shield	2½	4 6·2-in. Q.F., 10 3·9-in., 10 1·8-in., 4 1·4-in. M.	2	19·0	563	384
1st cl. *cr.*	**Cécille**	I. & S.	5933	378 9	49 3	19 9	2	10,200	La Seyne	1888	299,666	..	4	8 6·2-in. Q.F., 10 5·5-in., 6 1·8-in., 14 M.	4	19·0	940	486
2nd cl. *cr.*	**Chasseloup-Laubat**	S.	3758	308 6	43 6	20 10	2	9000	Cherbourg	1893	256,320	..	3	6 6·2-in. Q.F., 4 3·9-in., 8 1·8-in., 12 1·4-in. M.	6	19·25	587	358
1st cl. *cr.*	**Châteaurenault**	S.	8018	442 10	55 9	24 6	3	23,000	La Seyne	Bldg.	606,656	2	3	2 6·4-in. Q.F., 6 5.5-in., 10 1·8-in.	..	23	1400	625

FRANCE.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Material.	Displacement.	Length.	Beam.	Maximum Draught	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft. in.	ft. in.	ft. in.	no.				£	in.	in.			knots.	tons.	
3rd cl. *cr.*	Coëtlogon	S.	1932	312 0	30 5	14 0	2	5800	St. Nazaire	1889	134,000	..	1½	4 5·5-in. Q.F., 3 other Q.F., 4 M.	5	19·3	200	190
g. v.	Comète	C.	495	151 6	24 9	10 6	1	631	Cherbourg	1884	..	..	..	2 5·5-in., 2 3·9-in., 2 M.	..	12.2	60	84
to. cr.	Condor	S.	1243	216 6	29 3	15 5	2	3800	Rochefort	1885 1896	80,000	..	1½	5 3·9-in. Q.F., 1 2·5-in., 6 M.	5	17·7	160	134
3rd. cl. *cr.*	Cosmao	S.	1954	312 0	30 5	14 0	2	6000	Bordeaux	1888	133,000	..	..	4 5·5-in. Q.F., 8 other Q.F., 4 M.	5	20·5	200	190
to. g. b.	Couleuvrine	S.	435	196 10	21 7	5 11	2	2047	Havre	1885	33,778	..	..	4 1·8-in. Q.F., 3 M.	2	18·0	100	63
1st. cl. *cr.*	D 3	S.	5500	..	..	..	..	17,000		Pro.	..	..	..		..	23·0	..	..
to. g. b.	Dague	S.	408	196 10	21 7	5 11	2	2000	Havre	1885	36,119	..	..	4 1·8-in. Q.F., 3 M.	2	18·0	100	63
2nd. cl. *cr.*	D'Assas	S.	3952	325 6	44 11	20 6	2	9500	St. Nazaire	1896	292,682	2 shield	2½	6 6·2-in. Q.F., 4 3·9-in., 10 1·8-in., 11 1·4-in.	2	19·25	630	385
2nd. cl. *cr.*	Davout	S.	3017	297 6	40 0	17 6	2	8881	Toulon	1890	221,827	..	3	6 6·2-in. Q.F., 4 3·9-in., 4 2·5-in., 4 1·8., 6 M.	4	20·07	600	336
1st. cl. *cr.*	D'Entrecasteaux	S.	8114	383 7	58 6	25 9	2	13,500	La Seyne	1896	667,740	10–2¾ H.S.	4	2 9·4-in., 12 5·5-in Q.F., 12 1·8-in.	6	19·0	650	521
2nd. cl. *cr.*	Descartes	S. shd.	3990	326 0	42 4	21 4	2	9000 *t*	St. Nazaire	1894	334,725	..	1½	4 6·2-in. Q.F., 10 3·7-in., 8 1·8-in., 4 1·4-in.	2	21·0 *t*	552	386
3rd. cl. *cr.*	D'Estaing	W. & I.	2435	262 5	37 5	18 8	1	3700	Brest	1879	84,718	..	..	15 5·5-in., 8 M.	..	15·31	300	264
3rd. cl. *cr.*	D'Estrées (ex K 1)	S. shd.	2452	311 8	39 4	15 6	2	8500	Rochefort	Bldg.	..	..	..	2 5·5-in. Q.F., 4 3·9-in., 8 1·8-in.	..	20·5	..	231
to. g. b.	D'Iberville	S.	967	262 6	27 0	11 2	2	5060	St. Nazaire	1893	99,120	..	½	1 3·9-in. Q.F., 1 2·5-in., 4 1·4-in.	6	21·4	117	118
to. g. b.	Dragonne *	S.	410	196 10	21 7	5 11	2	2000	Havre	1885	36,074	..	..	4 5·5-in. Q.F., 3 M.	2	18·0	100	63
2nd. cl. *cr.*	Dubourdieu	W.	3577	253 7	46 6	22 10	1	3300	Cherbourg	1884	154,553	..	..	4 6·2-in., 12 5·5-in., 10 M.	2	14·0	600	496
2nd cl. *cr.*	Du Chayla	S. shd.	3952	325 6	44 11	20 6	2	9500	Cherbourg	1895	315,835	..	2½	6 6·4-in. Q.F., 4 3·9-in., 10 1·8-in., 11 1·4-in.	2	19·25	624	385
2nd cl. *cr.*	Duguay Trouin	I. & W.	3593	296 3	43 4	20 6	1	4399	Cherbourg	1877	132,116	..	..	5 6·2-in., 5 5·5-in., 4 1·8-in. Q.F., 5 M.	2	15·9	700	311
g. v.	Dumont d'Urville	W.	889	201 11	28 6	13 8	1	1081	Havre	1878	33,602	..	..	4 5·5-in., 1 3·9-in., 1 2·5-in., 2 M	..	11·6	200	116
to. g. b.	Dunois (ex M 3)	S.	896	256 0	27 10	12 8	2	6400	Cherbourg	Bld.	123,383	..	..	6 2·5-in. Q.F., 6 1·8-in.	..	23	137	128
3rd cl. *cr.*	Dupetit Thouars	W.	2049	257 10	35 9	16 0	1	2018	Brest	1874	58,220	..	..	10 5·5-in, 8 M.	..	15·07	300	200
2nd cl. *cr.*	Duquesne	I. & W.	5986	333 5	50 3	25 6	1	6589	Rochefort	1876	221,570	..	..	7 6·2-in. Q.F., 14 5·5-in., 8 M.	..	16·8	900	550
to. g. b.	Durandal	S.	300	180 5	19 5	10 6	2	4800	Havre	Bldg.	..	..	..	1 2·5-in. Q.F., 6 1·8-in.	2	26·0	45	48
3rd cl. *cr.*	Éclaireur†	I. & W.	1769	236 3	35 5	17 0	1	2050	Toulon	1877	16,232	..	...	8 5·5-in., 6 M.	..	15·0	200	195
to. cr.	Epervier	S.	1288	216 6	29 3	15 5	2	3200	Rochefort	1885	80,000	..	1½	5 3·9-in. Q.F., 1 2·5-in., 6 M.	5	17·6	160	134
g. v.	Etoile	C.	502	149 3	24 7	8 4	2	450	France	1885	29,782	..	..	6 3·9-in., 1 2·5-in., 2 M.	..	10·0	60	77
3rd cl. *cr.*	Fabert	W.	2100	294 4	36 0	18 4	1	1107	Rochefort	1874	61,967	..	..	8 5·5-in., 4 M.	..	12·42	300	218
to. cr.	Faucon	S.	1239	216 6	29 3	15 5	2	3200	Toulon	1887	80,000	..	1½	5 3·9-in. Q.F., 1 2·5-in., 6 M.	5	17·1	150	134
to. g. b.	Flèche	S.	425	196 10	21 7	5 11	2	2000	Havre	1885	37,517	..	..	4 1·8-in. Q.F., 3 M.	2	18·0	100	63
3rd cl. *cr.*	Fleurus †.	S.	1310	229 8	29 2	15 4	2	4000	Cherbourg	1893	128,530	..	..	5 3·9-in. Q.F., 6 1·8-in., 4 M.	..	18·0	118	179
" "	Forbin	S.	1820	312 0	30 5	16 0	2	5700	Rochefort	1888	123,739	..	1½	4 5·5-in. Q.F., 8 other Q.F., 4 M.	5	20·6	200	190
" "	Forfait	W. & I.	2464	249 4	38 0	18 0	1	2764	Toulon	1879	77,019	..	..	15 5·5-in., 8 M.	..	13·44	400	264
cr.	Foudre (torpedo transport)	S.	6090	370 6	52 6	23 6	2	11,900 *t*	Bordeaux	1895	407,712	..	3½	10 3 9-in. Q.F., 4 2·5-in., 4 1·4-in.	..	19·9 *t*	840	410
2nd cl. *cr.*	Friant	S.	3739	308 6	43 6	20 10	2	9500	Brest	1893	308,750	..	3	6 6·2-in. Q.F., 4 3·9-in. 8 1·8-in. 6 1 4-in.	2	18·19	587	358
g. v.	Fulton	W.	913	199 5	28 5	12 8	1	850	Lorient	1887	37,000	..	..	2 5·5-in., 1 3·9-in., 5 M.	..	13·0	160	116
" "	Gabès	C.	493	151 6	24 9	10 6	1	450	Rochefort	1884	28,624	..	..	2 5·5-in., 2 3·9-in.	..	11·0	60	84
3rd cl. *cr.*	Galilée	S.	2317	330 2	34 6	17 10	2	6600	Rochefort	1896	208,152	2 shields	1½	4 5·5-in. Q.F., 2 3·9-in., 8 1·8-in., 8 1·4-in.		20·0	226	248

* Converted experimentally into a howitzer gunboat. † New machinery, 1896.

FRANCE.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft. in.	ft. in.	ft. in.	no.				£	inches.	inches.			knots.	tons.	
1st cl. *cr.*	Guichen	S.	8277	436 4	54 10	24 7	3	24,000	St. Nazaire	Bldg.	611,945	..	3	2 6·4-in. Q.F., 6 5·5-in., 10 1·8-in.	..	23·0	1460	625
to. g. b.	Hallebarde*	S.	300	180 5	19 5	10 6	2	..	Havre	Bldg.	..	..	..	1 2·5-in. Q.F., 6 1·8-in.	2	26·0	45	48
d. v.	Inconstant	W.	891	199 5	28 5	12 7	1	850	La Seyne	1886	37,000	..	..	2 5·5-in., 1 3·9-in., 5 M.	..	13·0	160	116
2nd cl. *cr.*	Iphigénie (Training ship)	W.	3431	244 6	46 6	22 4	1	2800	..	1881	115,323	..	..	6 6·2-in., 2 3·5-in., 10 M.	1	14·6	400	391
3rd cl. *cr.*	Infernet (ex K 2)	S shd.	2452	311 8	39 4	15 6	2	8500	Bordeaux	Bldg.	..	..	..	2 5·5-in. Q.F., 4 3·9-in. 8 1·8-in.	..	20·5	..	234
2nd cl. *cr.*	Isly	S.	4477	346 0	43 6	19 6	2	8100	Brest	1891	252,760	..	3	4 6·2-in. Q.F., 6 5·5-in., 14 2·5-in. and 1·8-in., 8 M.	5	18·3	880	332
1st cl. *cr.*	Jurien de la Gravière (D 2)	S. shd.	5500	440 0	48 8	22 0	3	17,000	Lorient	Pro.	..	..	3	8 6·5-in. Q.F., 12 1·8-in.	2	23·0	600	511
,, ,,	(D 3)	S.	..	..	..	..	..	..	Contract									
2nd cl. *cr.*	Jean Bart	S.	4109	346 0	43 6	19 6	2	8000	Rochefort	1889	283,240	..	4	4 6·2-in. Q.F., 6 5·5-in., 14 2·5-in., and 1·8-in., 8 M.	5	19·0	940	332
g. v.	Kersaint	S. shd.	1243	226 0	34 5	15 0	1	2200	Rochefort	Bldg.	107,933	..	..	1 5·5-in. Q.F., 5 3·9-in., 7 1·4-in.	..	15·0	199	110
to. g. b.	Lahire (ex M 4)	S.	896	256 0	27 10	12 9	2	6400	Cherbourg	Bldg.	123,383	..	..	6 2·5-in. Q.F., 6 1·8-in.	..	23·0	137	128
3rd cl. *cr.*	Lalande	S.	1926	311 6	31 2	14 0	2	6000	Bordeaux	1888	133,800	..	1½	6 5·5-in. Q.F., 8 other Q.F., 4 M.	5	22·0	200	190
to. g. b.	Lance	S.	402	196 10	21 7	5 11	2	2000	Havre	1886	39,964	..	..	4 1·8-in., Q.F., 3 M.	2	18·0	100	63
3rd cl. *cr.*	Lapérouse	W.&I.	2372	262 5	37 5	18 8	1	2280	Brest	1877	85,347	..	..	15 5·5-in., 8 M.	..	14·73	300	264
,, ,,	Lavoisier	S.	2317	330 2	34 6	17 10	2	6400	Rochefort	Bldg.	202,024	2 shield	1½	4 5·5-in. Q.F., 2 3·9-in., 8 1·8-in., 6 1·4-in.	2	20·0	226	248
to. g. b.	Léger	S.	517	197 0	23 0	10 6	2	2360	Lorient	1891	52,000	..	..	1 3·9-in. Q.F., 3 2·5-in., 4 1·4-in.	3	18·8	130	69

* Described in revised shipbuilding programme for 1897 as torpilleur d'escadre, although resembling in all particulars the aviso-torpilleur Durandal.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
,, ,,	Lévrier	S.	505	197 0	23 0	10 6	2	2240	Lorient	1891	52,000	..	..	1 3·9-in. Q.F., 3 2·5-in., 4 1·4-in.	3	18·5	130	69
3rd cl. *cr.*	Linois	S.	2345	321 6	34 6	17 5	2	6600	La Seyne	1894	163,014	3·9	1½	4 5·5-in. Q.F., 2 3·9-in., 8 1·8-in., 4 1·4-in., 4 M.	4	20·5	200	248
g. v.	Lion	C.	503	151 6	24 9	10 6	1	576	Havre	1884	23,146	..	..	2 5·5-in., 4 M.	..	11·8	70	84
,, ,,	Lutin	C.	493	141 9	23 11	9 4	1	373	Cherbourg	1877	20,295	..	..	2 5·5-in., 2 3·9-in.	..	10·0	60	77
,, ,,	Lynx	C.	485	141 9	23 11	9 4	1	427	Cherbourg	1878	21,478	..	..	2 5·5-in., 2 3·9-in.	..	10·38	60	77
g. v.	Météore	C.	504	151 6	24 9	10 6	1	434	Cherbourg	1886	26,262	..	..	2 5·5-in., 3 M.	..	10·0	70	77
to. g. b.	M. 2	S.	300	180 5	19 5	10 6	2	..	..	Pro.	..	..	..	1 2·5-in. Q.F., 6 1·8-in.	2	26·0	..	60
3rd cl. *cr.*	Milan	S.	1733	303 2	32 10	14 7	2	3986	St. Nazaire	1886	89,058	..	..	5 3·9-in. Q.F., 8 M.	2	18·1	400	186
2nd cl. *cr.*	Naiade	I. shd.	3686	246 0	47 2	22 10	1	2700	Toulon	1881	128,275	..	..	2 6·2-in., 18 5·5-in., 10 M.	..	13·68	500	490
3rd cl. *cr.*	Nielly	W.&I.	2400	262 5	37 5	18 8	1	2921	Brest	1880	84,037	..	..	15 5·5-in., 8 M.	..	15·23	300	264
g. v.	Papin	W.&I.	891	199 6	28 6	13 7	1	855	La Seyne	1886	37,000	..	..	2 5·5-in., 1 3·9-in., 5 M.	..	13·0	160	116
2nd cl. *cr.*	Pascal	S.	4015	326 0	42 4	21 4	2	9000 *t*	Toulon	1895	322,321	..	1½	4 6·4-in Q.F., 10 3·9-in., 8 1·8-in., 4 1·4-in. M.	2	20·0 *t*	650	378
3rd cl. *cr.*	Primauguet	W. & I.	2447	262 5	37 5	18 8	1	2268	Rochefort	1882	108,592	..	..	15 5·5-in., 8 M.	..	14·50	300	264
2nd cl. *cr.*	Protet (ex E 4)	S. shd.	4065	331 10	44 8	21 1	2	9000	Bordeaux	Bldg.	324,992	2 shield	2½	4 6·2-in. Q.F., 10 3·9-in., 10 1·8-in., 4 1·4-in. M.	2	19·0	563	384
3rd cl. *cr.*	Roland	W.	2476	249 4	38 0	17 7	1	2291	Cherbourg	1882	84,184	..	..	15 5·5-in., 8 M.	..	14·50	350	264
to. g. b.	Sainte Barbe	S.	437	196 10	21 7	5 11	2	2000	Rouen	1885	43,233	..	1½	4 1·8-in. Q.F., 3 M.	2	18·0	100	63
,,	Salve	S.	413	196 10	21 7	5 11	2	2000	Rouen	1886	42,538	..	1½	4 1·8-in. Q.F., 3 M.	2	18·0	100	63

FRANCE.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Maximum Draught.		Propellers.	Indicated Horse-Power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	inches.	inches.			knots.	tons.	
g. v.	Scorpion	C.	505	151	6	24	9	10	6	1	511	Havre	1883	23,459	..	..	2 5·5-in., 3 M.	..	11·0	70	84
2nd cl. *cr.*	Sfax	S. & W.	4634	288	9	49	3	24	9	2	6522	Brest	1884	200,000	..	1½	6 6·2-in. Q.F., 10 5·5-in., 10 M.	5	16·84	1000	473
2nd cl. *cr.*	Suchet	S.	3334	318	3	43	6	17	6	2	9000	Toulon	1893	226,360	..	3	4 6·2-in. Q.F., 4 3·9-in., 4 1·8-in., 12 1·4-in., 6 M.	7	20·0	480	246
3rd cl. *cr.*	Surcouf	S.	2044	312	0	30	5	14	0	2	6000	Cherbourg	1888	131,200	..	1½	4 5·5-in. Q.F., 8 other Q.F., 4 M.	5	20·5	200	190
g. v.	Surprise	S.	627	184	8	24	7	12	3	1	853 *t*	Havre	1895 Pro.	50,954	..	..	2 3·9-in. Q.F., 4 2·5-in., 4 1·4-in.	..	13·4 *t*	73	99
g. v.	T. 1																				
1st cl. *cr.*	Tage	S. shd.	7589	390	0	53	8	22	10	2	12,410	St. Nazaire	1886	93,857	..	..	8 6·2-in., 10 5·5-in., 2 2·5-in., 6 Q.F., 14 M.	7	19·0	1000	400
2nd cl. *cr.*	Tourville*	I. & W.	5576	333	5	50	3	25	4	1	7466	La Seyne	1876	271,499	..	..	7 6·2-in. Q.F., 14 5·5-in., 8 M.	..	16·89	800	550
3rd cl. *cr.*	Troude	S.	2026	311	6	31	2	14	0	2	6000	Bordeaux	1888	33,383	..	1½	4 5·5-in. Q.F., 8 other do., 4 M.	5	20·9	200	190
3rd cl. *cr.*	Vautour	S.	1235	216	6	29	3	15	5	2	3391	Toulon	1886	87,733	..	1½	5 3·9-in. Q.F., 1 2·5-in. do., 6 M.	5	17·3	150	134
g. v.	Vipère	C.	486	145	4	23	10	10	6	1	441	Rochefort	1881	26,835	..	..	2 5·5-in., 2 3·9-in.	..	10·3	60	80
"	Voltigeur	W. & I.	943	199	5	28	5	12	7	1	999	Brest	1878	23,077	..	..	4 5·5-in., 4 M.	..	12·48	150	116
3rd cl. *cr.*	Wattignies	S.	1292	230	0	29	3	15	0	2	4189	Rochefort	1891	111,000	..	..	5 3·9-in. Q.F., 6 1·8-in., 7 1·4-in., M.	4	18·61	160	180

* New engines, 1893.

GERMANY.—Armoured Ships.

Class.	NAME.	Material.	Displacement.	Length.	Beam.	Mean Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position	Armour. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft. in.	ft. in.	ft. in.	no.				£	ins.	ins.	ins.			knots.	tons.	
c. d. s. b.	Aegir	S.	3600	236 6	50 6	17 9	2	4800	Kiel	1895	233,500	9½ H.S.	8 H.S.	3	3 9·4-in., 10 3·4-in. Q.F. 6 M.	3 (1 sub)	17·0	225 †	255
2nd. cl. b.	Baden*	I.	7441	321 6	60 0	15 8	2	4917	Kiel	1880 1896	444,886	16	10	3	6 10·2-in., 8 3·4-in. Q.F., 1 l., 8 M.	5 (2 sub)	14·0	700	376
a. g. b.	Basilisk	I.	1109	154 3	36 0	10 2	2	759	Bremen	1878	58,042	8	8	2	1 12-in., 2 3·3-in., , 2 M.	2	9·0	40	76
2nd. cl. b	Bayern	I.	7441	321 6	60 0	19 8	2	4917	Kiel	1878 1896	406,660	16	10	3	6 10·2-in., 8 3·4-in. Q.F., 1 l., 8 M.	5 (2 sub)	14·0	700	376
c. d. s. b.	Beowulf	S.	3500	259 2	49 3	17 9	2	4800	Bremen	1890	175,000	9½	8	1	3 9·4-in., 8 3·4-in. Q.F., 6 M.	4	16·0	225	225
1st. cl. b.	Brandenburg	S.	10,100	354 4	65 0	24 7	2	9640	Wilhelmshaven	1891	606,500	15¾ comp.	11¾ comp.	2½	6 11-in., 6 4·1-in. Q.F., 8 3·4-in., 8 M., 2 l.	7	16·5	750	552
a. g. b.	Biene	I.	1109	154 3	36 0	10 2	2	759	Bremen	1876	62,853								
a. g. b.	Camäleon	I.	1109	154 3	36 0	10 2	2	759	Bremen	1878	57,564	8	8	2	1 12-in., 2 3·3-in., 2 M.	2	10·0	40	76
"	Crocodil	I.	1109	154 3	36 0	10 2	2	759	Bremen	1879	57,237								
1st. cl. cr.	Deutschland	I.	7319	280 0	62 4	24 7	1	5360	Poplar	1874	412,022	10	8	2	8 10·2-in., 7 5·9-in., 9 3·4-in. Q.F., 12 M., 2 l.	5	14·5	710	668
3rd. cl. t.	Friedrich der Grosse	I.	6770	307 0	53 6	24 7	1	5400	Kiel	1874	365,170	9½	8 br. 10 tur.	..	4 10·2-in., 2 6·6-in., 10 3·4-in. Q.F., 8 M., 2 l.	4	14·0	550	537

* Receiving new machinery, a fighting mast with two tops, and part new armament.

† Also liquid fuel.

GERMANY.—Armoured Ships—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-Power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position.	Armour. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft. in.	ft. in.	ft. in.	no.				£	in.	in.	in.			knots.	tons.	
1st. cl. *b.*	**Friedrich der Grosse** (Ersatz)	S.	11,130	377 4	67 0	25 8	3	13,000	Wilhelmshaven	Bldg.	706,000	11¾ H. S.	9¾–6 H. S.	3	4 9·4-in. Q.F., 18 5·9-in. Q.F., 12 3·3-in., 24 1·9-in., 12 M.	6 (5 sub)	18·0	750	590
c. d. s. b.	**Frithjof**	S.	3500	240 0	49 3	17 9	2	4800	Bremen	1891	175,000								
c. d. s. b.	**Hagen**	S.	3500	240 0	49 3	17 9	2	4516	Kiel	1893	..								
c. d. s. b.	**Heimdall**	S.	3500	240 0	49 3	17 9	2	4393	Wilhelmshaven	1892	233,500	9¼ H. S.	7¾ H. S.	3	3 9·4-in., 8 3·4-in. Q.F., 6 M.	4	16·0	225	225
c. d. s. b.	**Hildebrand**	S.	3500	240 0	49 3	17 9	2	4413	Kiel	1892	218,000								
a. g. b.	**Hummel**	I.	1109	143 0	36 0	10 2	2	759	Bremen	1881	56,741	8	8	2	1 12-in., 2 3·3-in., 2 M.	2	10·0	40	76
1st. cl. *cr.*	**Kaiser**	I.	7531	292 0	62 4	24 7	1	5700	Poplar	1874	411,301	10	10	2	8 10·2-in., 1 5·9-in., 6 4-in., 9 3·4-in. Q.F., 2 M., 2 l.	5	14·6	710	668
t	**Kaiser Friedrich III.** (ex Ersatz Preussen)	S.	11,130	377 4	67 0	25 8	3	13,000	Wilhelmshaven	1896	706,000	11¾ H. S.	9¾–6 H. S.	3	4 9·4-in. Q.F., 18 5·9-in. Q.F., 12 3·3-in., 12 1·4-in., 8 M.	6 (5 sub)	18·0	650	655
1st. cl. *cr.*	**König Wilhelm**	I.	9757	355 0	60 0	26 7	1	8350	Blackwall	1868 1896	505,141	12	6	2½	20 5·9-in. Q.F., 18 3·4-in., 8 M., 4 l.	5	14·7	700	759
1st. cl. *b.*	**König Wilhelm** (Ersatz)	S.	11,000	377 4	67 0	25 8	3	13,000	Kiel (Germania)	Pro.	706,000	11¾ H. S.	9¾ H. S.	3	4 9·4-in. Q.F., 18 5·9-in. Q.F., 12 3·3-in., 24 1·9-in., 12 M.	6	18·0	750	590
1st. cl. *b.*	**Kurfürst Friedrich Wilhelm.**	S.	10,100	354 4	65 0	24 7	2	9959	Wilhelmshaven	1891	653,000	15¾ comp.	11¾ comp.	2½	6 11-in., 6 4·1-in. Q.F., 8 3·4-in., 8 M., 2 l.	7	16·0	750	552
a. c.	**Leipzig** (Ersatz)	S. shd.	10,650	393 8	66 9	26 0	3	14,000	Kiel	Bld.	..	7¾ H. S.	7¾ H. S.	3 H. S.	4 9·4-in. Q.F., 12 5·9-in. Q.F., 10 3·4-in., 10 1·4-in., 8 M.	6 (5 sub)	19.0	1000†	565
a. g. b.	**Mücke**	I.	1109	154 3	36 0	10 2	2	759	Bremen	1877	60,960	8	8	2	1 12-in., 2 3·3-in., 2 M.	2	10·0	40	76
a. g. b.	**Natter**	I.	1109	154 3	36 0	10 2	2	759	Bremen	1880	52,822	8	8	2	1 12-in., 2 3·3-in., 2 M.	2	10·0	40	76
c. d. s. b.	**Odin**	S.	3600	236 6	50 6	17 9	2	4800	Danzig	1894	..	9¼ H. S.	7¾ H. S.	3	3 9·4 in., 10 3·4-in. Q.F., 6 M.	3 (1 sub)	16·0	225†	266
2nd cl. *b.*	**Oldenburg**	S.	5200	246 0	59 0	19 6	2	3900	Stettin	1884	235,342	13 comp.	8 comp.	1	8 9·4-in. (Krupp), 2 3·4-in. Q.F., 6 M.	4	13·5	475	356
3rd cl. *t.*	**Preussen**	I.	6770	308 6	53 6	24 7	1	4383	Stettin	1873	351,904	9	8 10	..	4 10·2-in. (Krupp), 2 6·6-in., 10 3·4-in. Q.F., 6 M., 2 l.	4	14·0	550	537
2nd cl. *b.*	**Sachsen***	I.	7441	321 6	60 0	19 8	2	4917	Stettin	1877 1896	422,178	15¾	10	3	6 10·2-in. (Krupp), 8 3·4-in. Q.F., 1 l., 8 M.	5 (2 sub)	14·0	700	376
c. d. s. b.	**Siegfried**	S.	3500	240 0	49 3	17 9	2	4800	Kiel (Germania)	1889	175,000	9¼	7¾	3	3 9·4-in., 6 3·4-in. Q.F., 6 M.	4	16·0	225†	225
a. g. b.	**Salamander**	I.	1109	154 3	36 0	10 2	2	759	Bremen	1880	56,914								
„	**Skorpion**	I.	1109	154 3	36 0	10 2	2	759	Bremen	1877	60,796								
„	**Viper**	I.	1109	154 3	36 0	10 2	2	759	Bremen	1876	61,463	8	8	2	1 12-in., 2 3·3-in., 2 M.	2	10·0	40	76
„	**Wespe**	I.	1109	154 3	36 0	10 2	2	759	Bremen	1876	53,771								
1st cl. *b.*	**Weissenburg**	S.	10,100	354 4	65 0	24 7	2	9000	Wilhelmshaven	1891	659,475								
„	**Wörth**	S.	10,100	354 4	65 0	24 7	2	10,224 (*t*)	Kiel	1892	595,250	15¾	11¾	2½	6 11-in., 6 4·1-in. Q.F., 8 3·4-in., 8 M., 2 l.	7	16·0‡	750†	552
2nd cl. *b.*	**Württemberg***	I.	7441	321 6	60 0	19 8	2	4917	Stettin	1878 1896	402,512	15¾	10	3	6 10·2-in. (Krupp), 8 3·4-in. Q.F., 1 l., 8 M.	5 (2 sub)	14·0	700	376

* To receive new machinery, a fighting mast with two tops, and part new armament. † Also liquid fuel. ‡ Wörth: trial, 17·2 knots.
The Arminius, Friedrich Carl, and Kronprinz are now used for harbour service.

GERMANY—Cruising Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft. in.	ft. in.	ft. in.	no.				£	inches.	inches.			knots	tons.	
3.d cl. *cr.*	**Alexandrine**	I. S. & W.	2373	236 3	42 7	18 4	1	2400	Kiel	1885	102,877	..	..	10 5·9-in., 4 4·1-in., 10 M., 1 l.	1	14·0	..	267
" "	**Arcona**	I. S. & W.	2373	236 3	42 7	18 4	1	2400	Danzig	1885	109,875	..	..	10 5·9-in., 4 4·1-in., 10 M., 1 l.	1	14·0	..	267
" "	**Blitz**	S.	1382	246 0	32 10	13 5	2	2839	Kiel	1882	66,935	..	..	6 3·4-in., 4 M.	1	16·0	250	127
cr.	**Blücher**	I. & W.	2856	244 4	44 10	19 8	1	2990	Kiel	1877	136,408	..	..	2 5·9-in., 6 M.	7	14·0	400	206
g. b.	**Bremse**	S.	866	203 5	27 10	10 6	1	1500	Bremen	1884	49,308	..	2½	1 8·2-in.	..	15·0	65	73
g. b.	**Brummer**	S.	866	203 5	27 10	10 6	1	1500	Bremen	1884	52,422	..	2½	1 8·2-in.	..	15·0	65	73
3rd cl. *cr.*	**Bussard**	S.	1857	256 0	30 2	18 4	2	2900	Danzig	1890	..	..	3	8 4·1-in. Q.F., 7 M.	2	16·5	400	..
3rd cl. *cr.*	**Carola***	I. & W.	2169	226 4	42 7	18 4	1	2100	Stettin	1880	109,617	..	..	6 5·9-in., 2 4·1-in. Q.F., 8 3·4-in.	..	14·0	250	267
" "	**Falke**	S. & W.	1731	246 0	33 6	15 0	2	2900	Kiel	1891	..	..	3	8 4·1-in. Q.F., 7 M.	2	15·5	400	..
2nd cl. *cr.*	**Freya (Ersatz) "K" & "L" "M" & "N"**	S.	5650	344 5	57 0	21 8	3	10,000	Danzig, Stettin & Bremen	Bldg.	..	4 H.S.	4 H.S.	2 8·2-in. Q.F., 8 6-in. Q.F., 10 3·4-in., 10 1·4-in., 4 M.	3 sub.	20	500†	440
2nd cl. *cr.*	**Gefion**	S.	4207	344 6	48 8	..	2	9000	Elbing, (Schichau)	1893	..	..	3	8 5·9-in., 10 4·1-in. Q.F., 6 1·9-in., 1 l., 2 M.	2	20·0	950	312
3rd cl. *cr.*	**Geier**	S. & W. shd.	1776	249 4	34 10	15 6	2	2960	Wilhelmshaven	1894	..	..	3	8 4·1-in. Q.F., 7 M.	2	16·2	400	..
3rd cl. *cr.*	**Greif**	S.	2000	318 0	32 0	13 0	2	5400	Kiel	1886	..	..	..	2 3·4-in. Q.F., 4 M.	..	23·0	..	130
4th cl. *cr.*	**"G"**	S.	..	..	..	..	..	..	..	Bldg.	130,000	..	..	.. ..	..	..	..	155
g. v.	**Habicht**	I. & W.	848	174 0	29 6	11 5	1	600	Elbing	1879	33,054	..	..	5 4·9-in., 5 M.	..	12·0	..	128
d. v.	**Hela ("H")**	S.	2000	328 0	36 0	..	2	5860	Bremen	1895	..	..	..	4 3·4-in. Q.F., 6 1·9-in.	..	..	20·4	..
g. b.	**Hyäne**	I.	489	139 8	25 1	9 10	1	340	Wilhelmshaven	1878	24,340	..	..	1 4·9-in., 1 3·4-in., 4 M.	..	9·0	..	83
g. b.	**Hyäne (Ersatz)**	S.	..	..	..	..	..	..	..	Pro.	100,000	..	..	.. ..	..	..	..	..
g. b.	**Iltis (Ersatz)**																	
g. b.	**Iltis ‡**	I.	489	139 8	25 1	9 10	1	340	Danzig	1878	27,480	..	..	1 4·9-in., 1 3·4-in., 4 M.	..	9·0	..	83
2nd cl. *cr.*	**Irene**	S.	4400	339 6	46 0	21 0	2	8000	Stettin	1887	220,000	..	3	4 5·9-in., 8 4·1-in. Q.F., 6 1·9-in., 1 l., 8 M.	4	19·8	900	358
3rd cl. *cr.*	**Jagd**	S.	1250	275 6	31 6	13 9	2	4000	..	1888	..	..	2	4 3·4-in. Q.F., 2 M.	3	20·0	..	126
1st cl. *cr.*	**Kaiserin Augusta**	S.	6331	393 0	49 3	23 0	3	14,000	Kiel (Germania)	1892	..	..	3½	12 5·9-in., 8 3·4-in. Q.F., 2 l., 8 M.	5	22·5	..	427
to. g. b.	**Komet**	S.	946	262 6	31 2	13 9	2	5000	Stettin	1892	..	..	2	4 3·4-in. Q.F., 2 M.	1	21·0 (*t*)	..	90
3rd cl. *cr.*	**Kondor**	S. & W.	1640	246 0	33 6	15 0	2	2930	Hamburg	1892	..	..	3	8 4·1-in. Q.F., 7 M.	2	16·5	400	..
3rd cl. *cr.*	**Kormoran**	S. & W.	1640	246 0	33 6	15 0	2	2930	Danzig	1892	..	..	3	8 4·1-in. Q.F., 7 M.	2	16·0	400	..
3rd cl. *cr.*	**Marie**	I. & W.	2100	226 4	42 7	18 4	1	2100	Hamburg	1881	..	..	..	8 5·9-in., 2 3·4-in. Q.F., 1 l., 6 M.	..	13·5	..	267
d. v.	**Meteor**	S.	946	262 6	29 6	11 6	2	4500	Gaarden	1890	..	..	2	2 3·4-in. Q.F., 2 M.	3	21·0	..	90
3rd cl. *cr.*	**Nixe §**	I. & W.	1760	177 2	42 8	18 0	1	700	Danzig	1885	..	..	..	8 5·9-in.	..	10·5	..	116
3rd cl. *cr.*	**Olga**	I. & W.	2100	226 4	42 7	18 4	1	2100	Stettin	1880	113,812	..	..	8 5·9-in., 2 3·4-in. Q.F., 1 l., 6 M.	..	14·0	..	267
3rd cl. *cr.*	**Pfeil**	S.	1382	246 0	32 10	13 5	2	2700	Wilhelmshaven	1882	73,605	..	..	4 3·4-in. Q.F., 4 M.	1	16·0	250	127
2nd cl. *cr.*	**Prinzess Wilhelm**	S.	4400	339 6	46 0	21 0	2	8000	Gaarden	1887	220,000	..	3	4 5·9-in., 8 4·1-in. Q.F., 6 1·9-in., 1 l., 8 M.	4	18·7	900	358
4th cl. *cr.*	**Schwalbe**	S. & W.	1120	203 0	30 6	12 4	2	1500	Wilhelmshaven	1887	..	..	3	8 4·1-in. Krupp, 7 M.	..	13·5	300	150
3rd cl. *cr.*	**Seeadler**	S. & W.	1640	246 0	33 6	15 0	2	2800	Hamburg	1892	..	..	3	8 4·1-in., 7 M.	2	16·0	400	156
3rd cl. *cr.*	**Sophie**	I. & W.	2100	226 4	42 7	18 4	1	2100	Danzig	1892	117,155	..	..	8 5·9-in., 2 3·4-in. Q.F., 1 l., 6 M.	..	14·0	..	267

* Gunnery ship for quick-firing guns. † Displacement with 950 tons of coal, 6100 tons. Provision made for liquid fuel. ‡ Iltis lost off the Shantung Peninsula, July 23rd, 1896. § Training Ship.

GERMANY.—Cruising Ships—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.				£		in.			knots	tons.	
4th cl. *cr.*	**Sperber**	S. & W.	1120	236 0	29 8	12 6	2	1500	Wilhelmshaven	1888	..	..	3	8 4·1-in., 6 M.	..	13·5	300	150
3rd cl. *cr.*	**Wacht**	S.	1250	275 6	31 6	13 9	2	4000	Bremen	1887	..	..	2	4 3·4-in. Q.F., 2 M.	3	19·6	..	126
g. b.	**Wolf**	I.	480	139 8	25 1	9 10	1	340	Wilhelmshaven	1878	24,343	..	..	1 4·9-in., 1 3·4-in., 4 M.	..	9·0	..	83
d. v.	**Zieten**	I.	975	196 10	29 6	11 6	1	2323	Blackwall	1876	81,755	..	..	4 1·9-in. Q.F., 6 M.	..	16·0	140	111
to. g. b.	1 Torpedo Gunboat, D 11	S.	300	211 9	19 6	7 6	2	5500	Chiswick	Bldg.	..	..	..	5 Q.F.	2	27·5	..	..
"	2 Torpedo Gunboats, D 9, D 10.	S.	380	197 0	24 3	9 10	2	4500	Elbing	1891	..	..	..	3 Q.F.	3 1 sub.	26·0	..	..
"	2 Torpedo Gunboats, D 7, D 8.	S.	350	213 3	23 0	9 10	2	4000	Elbing	1890 1891	..	..	..	3 Q.F.	3	26·0	140	..
"	2 Torpedo Gunboats, D 5, D 6.	S.	320	190 0	23 0	9 10	2	3600	Elbing	1888 1889	..	..	..	4 Q.F., 2 M.	3	22·0	..	..
"	2 Torpedo Gunboats, D 3, D 4.	S.	300	184 0	21 8	9 10	2	2500	Elbing	1888	..	..	..	4 Q.F., 2 M.	2	21·0	..	..

The Charlotte, Mars, Grille, Hay, Ulan, Gneisenau, Moltke, Stein and Stosch, in addition to others given in the list, are used as schoolships.
Note.—The torpedo-gunboats (Torpedo-Division boats) of 300 tons and over are included in this list, though they will also be found in the torpedo-boat tables.
The Imperial Yacht Hohenzollern, 4187 tons, 9460 I.H.P., 22 knots, carries 8 1·9-in. Q.F., but provision is made for mounting 3 4·1-in., 12 1·9-in. Q.F. and 4 M.
A station vessel for Constantinople has been bought and named Loreley, the older ship having been removed from the list.

Merchant Cruisers (Auxiliaries to the German Navy).

To what Company belonging.	Name of Ship.	Displacement.	Length.	Beam.	Draught of Water.	Indicated H.P.	Ocean Speed.	When Built.	Armament of each Ship.
		tons.	ft. in.	ft. in.	ft. in.		knots.		
Hamburg-American S.S. Co.	Fürst Bismarck	10,500	502 0	50 10	23 3	16,400	19½	1891	
	Normannia	10,500	498 9	57 6	22 3	16,250	19	1890	
	Columbia	9,500	462 6	56 0	19 8	13,680	19	1889	8 5·9-in., 4 4·7-in., 2 3·4-in. Q.F., 2 2·2-in., 14 M.
	Augusta Victoria	9,500	459 3	56 0	23 0	12,280	18	1889	
North German Lloyd	Spree	8,900	462 6	51 10	22 0	12,770	19	1890	
	Havel	8,900	462 6	51 10	22 3	12,770	19	1890	
	Lahn	7,700	449 6	49 0	22 0	9,500	18½	1887	
	Aller	4,965	436 6	48 0	..	1,300(a)	16	1885	
	Saale	4,965	436 6	48 0	..	1,300(a)	16	1886	Not known.
	Trave	4,965	436 6	48 0	..	1,300(a)	16	1886	

(a) Nominal horse-power.

GREECE.—Armoured Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Battery.	Armour. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.					inches.	inches.	ins.			knots.	tons.	
c.d.s.	Basileos Georgios	I.	1774	200 2	36 0	15 6	2	2100	Blackwall	1867	..	7	6	9	2 6·6-in. (Krupp), 1 5·9-in. 9 M.	1	12 0	210	120
br.	Basilissa Olga* .	W.	2030	230 0	59 0	18 0	1	1950	San Rocco	1869	..	6	4½	..	4 6·6-in. 5½-ton (Krupp), 2 6·6-in. 3½-ton, 4 M., 4 l. .	3	10·0	240	400
b.	Hydra . .	S.	4885	334 6	51 10	23 3	2	7000	St. Nazaire	1889	.. }								
b.	Psara . . .	S.	4885	334 6	51 10	23 3	2	7000	Havre . .	1890	.. }	11¾	13½	2½	3 10·6 in. Canet, 5 5·9 in. do. Q.F., 4·41-in. Q.F., 2 2·2-in., 16 M.	3	17·0	600	400
b.	Spetsai . .	S.	4885	334 6	51 10	23 3	2	7000	Havre . .	1889	.. }								

* Has received two fighting masts and new machinery; similar changes in the Georgios.

The Psara, Hydra and Spetsai are to receive 1 3·9-in. Q.F. and 8 2·5-in. Q.F. guns (Canet), in addition to the present armament, but the transformation of the two last named has been deferred.

GREECE.—Cruising Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Maximum Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour.		Armament.		Speed.	Normal Coal Supply.	Complement.
															Gun Position.	Deck.	Guns.	Torpedo Tubes.			
			tons.	ft.	in.	ft.	in.	ft.	in.	no.									knots.	tons.	
g.v.	Acheloos	S.	420	130	0	24	6	11	6	1	400	Blackwall	1884	..	..	..	2 3·7-in. (Krupp), 3 M.	..	10·0	50	..
g.v.	Alphios	S.	420	130	0	24	6	11	6	1	400	Blackwall	1884	..	..	..	2 3·7-in. (Krupp), 3 M.	..	10·0	50	..
g.v.	Aphroessa	I.	380	124	7	22	11	9	10	1	160	Pt. Glasgow	1858	..	..	..	1 3·4-in. (Krupp)	..	9·0	30	..
g.v.	Eurotas	S.	420	130	0	24	6	11	6	1	400	Dumbarton	1884	..	..	..	2 3·7-in. (Krupp), 3 M.	..	10·0	50	..
corv.	Hellas (training)	W.	1654	200	2	37	0	19	4	1	1500	Northfleet	1858 rep. 1878–90	..	..	..	6 5·9-in. (Krupp), 2 M.	..	11·0	230	..
cr.	Mykale (transport)	S.	1000	210	6	32	6	18	0	2	2400	Glasgow	1880	..	..	..	2 M.	..	1·4	..	..
corv.	Nauarchos Miaulis	I. & W.	1800	246	0	36	0	14	5	1	2200	La Seyne	1879	..	..	..	3 6·6-in., 5½-ton (Krupp), 1 6·6-in. 3½-ton do., 2 M., 4 l.	..	15·0	220	250
g.v.	Paralos	I.	380	123	0	23	11	9	10	1	204	Pt. Glasgow	1858	..	..	..	1 3·4-in. (Krupp), 1 M.	..	8·0	60	..
g.v.	Pinios	S.	420	130	0	24	6	12	6	1	400	Dumbarton	1884	..	..	..	2 3·7-in. (Krupp), 3 M.	..	10·55	50	..
g.v.	Plixaura	I.	380	124	7	22	11	9	10	1	160	Pt. Glasgow	1856	..	..	..	1 3·4-in. (Krupp)	..	9·0	55	..
g.v.	Salaminia	I.	380	123	0	23	11	9	10	1	200	Pt. Glasgow	1858	..	..	..	1 3·4-in. (Krupp), 1 M.	..	8·0	60	..
corv.	Sfaktirea	S.	1000	216	6	29	3	18	0	1	2400	England	1885	..	..	..	2 3·9-in. (Krupp), 2 M.	..	14·5	100	100
g.v.	Syros	I.	380	124	7	22	11	9	10	1	160	Pt. Glasgow	1858	..	..	..	1 3·4-in. (Krupp)	..	9·0	18	..

Torpedo depôt-ship.—Kanaris, 1100 tons, 500 I.H.P., 2 3·9-in. (Krupp) guns, 2 Whitehead torpedo-launching guns on broadside, 2 under-water torpedo tubes ahead. 14 knots speed.

There are also 2 gunboats, Ambrakia and Aktion, of 440 tons displacement, 380 horse-power, 10 knot speed, fitted with 1 10·2-in. Krupp gun and 2 machine guns; launched 1885; 4 gunboats, A. B. Γ. Δ. (52 tons, 1 4·7-in. Krupp), launched 1881; and 3 mining vessels (300 tons), launched 1881.

ITALY.—Armoured Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Maximum Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position	Armour. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	inches.	inches.	ins.			knots.	tons.	
t.	Affondatore	I.	4062	290	0	40	0	20	0	1	3240	Millwall	1865	197,600	5	5	2	2 28-ton (Armstrong), 6 4·7-in. Q.F., 2 2·9-in., 4 2·2-in., 4 1·4-in., 2 M.	2	12·0	460	303
"	Ammiraglio di St. Bon	S.	9800	344	6	69	4	24	9	2	13,500	Venice	Bldg.	..	9¾–4 H.S.	9¾ H.S.	3–1½	4 10-in., 8 6-in. Q.F., 8 4·7-in., 2 2·9-in., 8 2·2-in., 12 1·4-in., 2 M.	5	18·0	1000	..
a.c.	Ancona	I.	4460	256	0	50	0	25	0	1	2548	Bordeaux	1864	172,000	4½	4½	..	6 6-in. Q.F., 6 4·7-in., 2 2·9-in., 8 2·2-in., 12 1·4-in., 2 M.	3	12·0	485	423
b.	Andrea Doria	S.	11,000	328	2	65	4	27	2	2	10,500	Spezia	1885	765,500	18 comp.	18 comp.	3	4 105-ton (Armstrong), 2 6-in. 4 4·7-in. Q.F., 2 2·9-in., 10 2·2-in., 17 1·4-in., 2 M.	5 (2 sub)	16·1	850	509
a.c.	Carlo Alberto	S.	6500	325	0	59	0	22	11	2	13,000	Spezia	1896	..	6 H.S.	6 H.S.	1½	12 6-in. Q.F., 6 4·7-in., 2 2·9-in., 10 2·2-in., 10 1·4-in., 2 M.	5	20·0	1000	460
a.c.	Castelfidardo	I.	4250	256	0	50	0	21	11	1	2125	St. Nazaire	1863	233,000	4½	4½	13¾	6 6-in. Q.F., 6 4·7-in., 2 2·9-in., 8 2·2-in., 12 1·4-in., 2 M.	3	12·0	485	423
t.	Dandolo *	I&S	11,202	340	11	64	9	26	7	2	8045	Spezia	1878	872,640	21½	18	2	4 10-in. (Armstrong), 7 6-in. Q.F., 5 4·7-in., 2 2·9-in., 10 2·2-in., 14 1·4-in., 2 M.	4	15·6	1000	487
t.	Duilio	I&S	11,138	340	11	64	9	26	7	2	7710	Castellammare	1876	850,400	21½	18	2	4 100-ton M.L.R. (Armstrong), 3 4·7-in. Q.F., 2 2·9-in., 8 2·2-in., 22 1·4-in., 2 M.	4	15·0	1000	487
t.	Emanuele Filiberto	S.	9800	344	6	69	4	24	9	2	13,500	Castellammare	Bldg.	..	9¾–4	9¾	3–1	4 10-in., 8 6-in. Q.F., 8 4·7-in., 2 2·9-in., 8 2·2-in., 12 1·4-in., 2 M.	5	18·0	1000	..
b.	Francesco Morosini	S.	11,000	328	2	65	4	27	2	2	10,000	Venice	1885	770,680	18 comp.	18 comp.	3	4 105-ton (Armstrong), 2 6-in., 4 4·7-in. Q.F., 2 2·9-in., 10 2·2-in., 17 1·4-in., 2 M.	5 (2 sub)	17·0	850	509
a.c.	Giuseppe Garibaldi†	S.	6840	328	0	59	8	24	0	2	13,000	Sestri Ponente	Bldg	520,000	6 H.S.	6 H.S.	1½	2 10-in., 10 6-in. Q.F., 6 4·7-in., 10 2·2-in., 10 1·4-in., 2 M.	4	20·0	1000	450
"	Italia	S.	14,387	400	6	74	0	31	2	2	11,986 (t)	Castellammare	1880	1,167,680	16 funnel op'nings	19 comp.	3	4 100-ton (Armstrong), 8 6-in., 4 4·7-in. Q.F., 12 2·2-in., 24 1·4-in., 2 M.	4	18·0	1650	748
b.	Lepanto	S.	14,400	400	6	74	0	31	2	2	15,800 (t)	Leghorn (Orlando)	1883	1,150,880	16 funnel op'nings	19 comp.	3	4 100-ton (Armstrong), 8 6-in., 4 4·7-in. Q.F., 12 2·2-in., 34 1·4-in., 2 M.	4	18·38	1650	748
a.c.	Marco Polo	S.	4583	327	0	48	3	19	6	2	10,000	Castellammare	1890	344,400	4	4	1	6 5·9-in. Q.F., 10 4·7-in., 2 2·9-in., 9 2·2-in., 4 1·4-in., 2 M.	5 (1 sub.)	19.0	..	315
a.c.	Maria Pia	I.	4268	256	0	49	4	22	7	1	2924	La Seyne	1863	215,000	4½	4½	..	8 5·9-in., 6 4·7-in. Q.F., 2 2·9-in. 10 2·2-in. 10 1·4-in., 2 M.	2	12·0	485	423
b.	Re Umberto	S.	13,825	400	0	76	9	28	6	2	19,500	Castellammare	1888	1,058,500	4	18	3	4 67-ton (Armstrong), 8 6-in. Q.F., 16 4·7-in., 2.9 in., 15 2·2-in., 14 1·4-in., 2 M.	8	19·0	1200	785
b.	Ruggiero di Lauria	S.	11,000	328	2	65	4	27	2	2	10,600	Castellammare	1884	777,560	18 comp.	18 comp.	3	4 105-ton (Armstrong), 2 6-in. 4 4·7-in. Q.F., 2 2·9-in., 10 2·2-in., 17 1·4-in., 2 M.	5 (2 sub.)	17·0	850	509
a.c.	San Martino (training service)	I.	4268	256	0	49	4	22	7	1	2620	La Seyne	1863	213,880	4½	4½	..	8 5·9-in., 6 4·7-in. Q.F., 2 2·9-in., 10 2·2-in., 10 1·4-in., 2 M.	2	12·0	490	423
b.	Sardegna	S.	13,860 (t)	411	0	76	9	28	6 (t)	2	20,800 (t)	Spezia	1890	1,057,440	4	14½ comp.	3	4 67-ton (Armstrong), 8 5·9-in. Q.F., 16 4·7-in., 2 2·9-in., 20 2·2-in., 10 1·4-in., 2 M.	5	20·0 (t)	1200	785
"	Sicilia	S.	13,375	400	0	76	9	28	6	2	19,500	Venice	1891	1,050,000	4	18 comp.	3	4 67-ton (Armstrong), 8 5·9-in. Q.F., 16 4·7-in., 2 2·9-in., 20 2·2-in., 10 1·4-in., 2 M.	5	19·2	1200	785
a.c.	Varese†	S.	6840	328	0	59	8	24	0	2	13,000	Leghorn (Orlando)	Bldg.	..	6 H.S.	6 H.S.	1½	2 10-in., 10 6-in. Q.F., 6 4·7-in., 10 2·2-in., 10 1·4-in., 2 M.	4	20·0	1000	470
a.c.	Vettor Pisani	S.	6500	325	0	59	0	22	11	2	13,000	Castellammare	1895	..	6 H.S.	6 H.S.	1½	12 6-in. Q.F., 6 4·7-in., 2 2·9-in., 10 2·2-in. 10 1·4-in., 2 M.	5	20·0	600	..

* New armament given; Duilio to receive the same. † Building to replace two cruisers of the same name sold before completion to the Argentine and Spanish Governments.

Note.—The Palestro, Principe Amedeo, and Roma, are non-effective, or only available for coast defence. An armoured cruiser of 10,000 tons displacement is also projected, with 18,000 I.H.P. and 23 knots speed.

ITALY.—Cruising Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Maximum Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armaments. Guns.	Armaments. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	in.	in.			knots.	tons.	
to.cr	Agordat	S.	1313	289	0	30	6	11	1	2	..	Castellammare	Bldg.	..	..	1	.. .. ..	..	23·0	..	111
3rd cl. cr.	Amerigo Vespucci (training)	S.	2795	255	11	42	7	17	0	1	3340	Venice	1882	176,300	..	¾	6 5·9-in., 4 2·2-in., 8 1·4-in., 2 l., 4 M.	2	14·0	500	265
g.v.	Andrea Provana	S.	649	167	4	26	3	10	2	1	1080	Leghorn (Orlando)	1884	39,760	..	..	4 4·7 in., 3 1·4-in., Q.F.	..	13·0	120	103
d.v.	Archimede	S.	784	230	0	26	3	10	0	1	1700	Venice	1887	60,120	..	..	4 4·7-in., 2 2·2-in. Q.F., 2 1·4-in.	2	16·0	210	109
to.g.b.	Aretusa	S.	846	230	0	26	10	11	9	2	4420	Leghorn (Orlando)	1891	72,920	..	1	1 4·7-in., 6 2·2-in., and 3 1·4-in.	6	20·7	180	111
3rd cl. cr.	Calabria	S.	2470	249	4	42	0	16	7	2	6500	Spezia	1894	183,120	..	2	4 5·9-in. Q.F., 6 4·7-in., 1 2·9-in., 8 2·2-in., 8 1·4-in., 2 M.	2	19·0	500	257
to.g.b.	Calatafimi	S.	840	229	6	27	0	10	2	2	4000	Castellammare	1893	72,920	..	1	1 4·7-in. Q.F., 6 2·2-in., 3 1·4-in.	6	20·0	120	111
"	Caprera	S.	853	230	0	27	4	10	2	2	4800	Leghorn (Orlando)	1894	72,920	..	1	2 4·7-in. Q.F., 4 2·2-in., 2 1·4-in. Q.F.	5	21·0	180	111
g.v.	Cariddi	W.	1050	177	2	28	6	12	5	1	956	..	1875	65,480	..	..	2 4·7-in., 4 2·2-in. Q.F.	..	10·0	164	..
"	Castore	S.	530	116	0	36	0	9	6	1	364	Pozzuoli (Armstrong)	1889	68,120	..	..	1 15·7-in. (Krupp), 2 1·4-in. Q.F.	..	8·0	..	40
to.cr.	Coatit	S.	1313	289	0	30	6	11	1	2	..	Castellammare	Bldg.	..	..	1	.. .. ..	..	23·0	..	111
to.g.b.	Confienza	S.	768	230	0	25	6	9	0	2	1887	Spezia	1887	61,480	..	1	1 4·7-in. Q.F., 6 2·2-in., 2 1·4-in.	4	17·0	180	111
3rd cl. cr.	Cristoforo Colombo	S.	2675	249	0	36	0	17	6	..	3800	Venice	1892 Reblt	157,240	..	..	6 4·7-in., 4 2·2-in., Q.F., 4 1·4-in.	..	16·0	500	203
g.v.	Curtatone	S.	1040	177	3	32	8	13	6	1	1100	Venice	1887	58,440	..	..	6 4·7-in. Q.F., 4 2·2-in., 2 1·4-in., 2 M.	..	12·0	197	131
3rd cl. cr.	Dogali	S.	2088	250	0	37	0	14	6	2	7600	Elswick	1887	156,040	4½	2	6 6-in. (Armstrong), 1 2·9-in., 9 2·2-in. Q.F., 2 1·4-in., 2 M.	4	19·66	480	257
"	Elba	S.	2730	272	6	40	8	16	7	2	7471 (t)	Castellammare	1893	200,000	4½	2	4 5·9-in. Q.F., 6 4·7-in., 1 2·9-in., 8 2·2-in., 8 1·4-in., 2 M.	4	17·9t	..	257
2nd cl. cr.	Etna	S.	3530	282	2	42	7	19	0	2	7480	Castellammare	1885	226,720	5	1½	2 9·8-in. (Armstrong), 6 5·9-in., 1 2·9 in., 5 2·2-in. Q.F., 8 1·4-in., 2 M.	4	17·8	630	315
to.g.b.	Euridice		840	229	6	27	0	10	2	2	4000	Castellammare	1891	72,920	..	1	1 4·7-in. Q.F., 6 2·2-in., 3 1·4-in.	5	19·8t	120	111
3rd cl. cr.	Etruria	S.	2280	262	6	39	6	16	7	2	7585 (t)	Leghorn (Orlando)	1891	183,120	4½	2	4 5·9-in. Q.F., 6 4·7-in., 1 2·9-in., 8 2·2-in., 10 1·4-in., 2 M.	2	19·84	400	257
2nd cl. cr.	Fieramosca	S.	3600	290	0	43	6	19	4	2	7700	Leghorn (Orlando)	1888	240,120	5	1½	2 9·8-in., 6 6-in. Q.F., 1 2·9-in., 5 2·2-in., 8 1·4-in., 2 M.	4	17·5	590	315
3rd cl. cr.	Flavio Gioja (training)	S.	2533	255	11	42	7	17	0	1	4150	Castellammare	1881	193,920	..	1½	6 5·9-in., 4 2·2-in. Q.F., 8 1·4-in., 2 l., 4 M.	2	15·0	500	265
to.g.b.	Folgore	S.	370	187	0	19	8	6	7	2	2040	Castellammare	1886	39,840	..	..	2 6-pr. and 4 3-pr. Q.F.	4	20·0	60	45
d.v.	Galileo	S.	770	230	0	26	3	8	2	1	1700	Venice	1887	56,720	..	..	4 4·7-in., 2 2·2-in. Q.F., 2 1·4-in.	2	15·0	210	109
3rd cl. cr.	Giovanni Bausan	S.	3068	275	7	42	7	18	4	2	6500	Elswick	1883	179,120	5	1½	2 9·8-in. (Armstrong), 6 5·9-in., 1 2·9-in., 4 2·2-in. Q.F., 8 1·4-in., 2 M.	3 (1sub.)	17·5	600	267
to.g.b.	Goito	S.	812	230	0	25	6	11	9	2	2620	Castellammare	1887	70,680	..	1	4 2·2-in. Q.F., 5 1·4-in.	5	19·0	180	111
g.v.	Governolo	S.	1255	185	0	33	9	13	9	1	1100	Venice	1894	58,440	..	..	4 4·7-in. Q.F., 4 2·2-in., 2 1·4-in., 2 M.	..	13·0	200	131
to.g.b.	Iride	S.	840	229	6	27	0	10	2	2	4000	Castellammare	1891	72,920	..	1	1 4·7-in. Q.F., 6 2·2-in., 3 1·4-in.	6	19·6	120	111

ITALY.—Cruising Ships.—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun-Position.	Armour. Deck.	Armaments. Guns.	Armaments. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.				£	in.	in.			knots.	tons.	
3rd cl. cr.	Liguria	S.	2280	262 6	39 4	16 9	2	7677 (t)	Sestri (Ansaldo)	1893	183,120	4½	2	4 5·9-in. Q.F., 6 4·7-in., 1 2·9-in., 8 2·2-in., 10 1·4-in., 2 M. (2 Maxims).	2	18·0	430	257
" "	Lombardia	S.	2380	262 6	39 6	16 7	2	6843 (t)	Castellammare	1890	183,120	4½	2	4 5·9-in. Q.F., 6 4·7-in., 1 2·9-in., 8 2·2-in., 8 1·4-in., 2 M.	2	17·0t	430	257
d.v.	Marcantonio Colonna	S.	656	216 6	23 11	10	1	1700	..	1879	51,480	..	..	5 2·2-in. Q.F., 2 M.	..	15·4	197	100
to.g.b.	Minerva	S.	846	246 0	27 6	11 9	2	4800	Sestri (Ansaldo)	1892	72,720	..	1	1 4·7-in. Q.F., 6 2·2-in., 3 1·4-in.	5	19·0	120	111
"	Montebello	S.	814	230 0	25 6	11 9	3	2776	Spezia	1888	74,120	..	1	6 2·2-in. Q.F., 2 1·4-in.	4	19·0	100	111
"	Monzambano	S.	840	230 0	25 6	11 9	3	1953	Spezia	1888	70,680	..	1	6 2·2-in. Q.F., 2 1·4-in.	4	17·0	100	111
"	Partenope	S.	840	246 0	27 6	11 9	2	4200	Castellammare	1890	71,000	..	1	1 4·7-in. Q.F., 6 2·2-in., 3 1·4-in.	5	19 0	100	111
3rd cl. cr.	Piemonte	S.	2500	300 0	38 0	15 0	2	12,000	Elswick	1888	220,000	3	3	6 6·6-in. Q.F., 6 4·7-in., 10 2·2-in., 6 1·4-in., 4 M.	3	21·0	560	296
g.v.	Polluce	S.	530	116 0	36 0	9 6	1	390	Pozzuoli (Armstrong)	1889	68,120	..	..	1 4·7-in. (Krupp), 2 1·4-in. Q.F.	..	8·0	..	40
3rd cl. cr.	Puglia	S.	2550	273 0	40 9	16 9	2	1000	Taranto	Bldg.	..	4½	1	4 5·9-in. Q.F., 6 4.7-in., 1 2·9-in., 8 2·2-in., 8 1·4-in., 2 M.	..	20·0	650	257
3rd cl. cr. / "	Principe di Napoli / Regina Margherita	S.	2500	..	..	..	..	6500	..	Pro.	..	..	..	..	..	20·0	..	..
d.v.	Rapido	I.	1568	262 5	30 6	12 6	1	1920	Leghorn (Orlando)	1876	77,400	..	..	5 2·2 in. Q.F., 2 M.	..	13·4	300	135
to.g.b.	Saetta	S.	400	187 0	19 8	6 7	2	2400	Castellammare	1887	38,880	..	..	2 2·2-in. Q.F., 4 1·4-in.	3	20·0	90	58
cr.	Savoia (used as the Royal Yacht)	S.	2850	275 6	42 7	17 0	1	3340	Castellammare	1883	176,160	..	1·5	6 2·2-in. Q.F., 6 1·4-in., 4 1., 2 M.	2	14·0	600	216
g.v.	Scilla	W.	1076	177 2	28 6	12 5	1	826	Casellammare	1874	65,520	..	..	4 2·2-in. Q.F., 2 M.	..	10·0	140	111
"	Sebastiano Veniero	S.	629	170 0	26 3	10 6	1	1160	Leghorn (Orlando)	1884	36,160	..	..	4 4·7-in., 3 1·4-in. Q.F.	..	13·0	150	103
d.v.	Staffetta	I.	1388	252 7	30 10	13 2	1	1800	S. Pierdarena (Ansaldo)	1876	82,600	..	..	4 4·7-in., 7 1·4-in. Q.F.	1	13·5	300	135
2nd cl. cr.	Stromboli	S.	3475	282 2	42 7	19 0	2	6252	Venice	1886	220,080	5	1·5	2 9·8-in. (Armstrong), 6 5·9-in., 1 2·9-in., 5 2·2-in. Q.F., 8 1·4-in., 2 M.	4	17·0	630	315
to. g.b.	Tripoli	S.	848	230 0	25 10	11 9	3	2543	Castellammare	1886	72,080	..	1	4 2·2-in. Q.F., 4 1·4-in.	5	18·0	130	111
3rd cl. cr.	Umbria	S.	2280	262 6	39 6	16 7	2	7104 (t)	Leghorn (Orlando)	1891	183,120	4½	2	4 5·9-in. Q.F., 6 4·7-in., 8 2·2-in., 10 1·4-in., 1 1., 2 M.	4	18·83 (t)	430	257
to. g.b.	Urania	S.	846	230 0	27 0	11 2	2	4000	Sestri (Odero)	1891	72,920	..	1	1 4·7-in. Q.F., 6 2·2-in., 3 1·4-in.	6	20·0	120	111
d.v.	Vedetta	I.	827	183 9	26 11	11 5	1	670	Genoa	1866	32,400	..	..	4 4·7-in., 6 1·4-in. Q.F.	..	11·0	137	40
2nd cl. cr.	Vesuvio	S.	3427	282 2	42 7	19 0	2	6820	Leghorn (Orlando)	1886	218,320	5	1·5	2 9·8-in., 6 5·9-in., 1 2·9-in., 5 2·2-in. Q.F., 8 1·4-in., 2 M.	4	17·0	600	315
g.v.	Volturno	S.	1040	177 3	32 8	14 4	1	1100	Venice	1887	58,960	..	..	4 4·7-in., 4 2·2-in. Q.F., 2 1·4-in., 2 M.	..	13·0	206	131

Subsidised auxiliary cruisers and despatch vessels.—Nord America, Vittoria, Duca de Galliera, and Duchessa di Genova (La Veloce S.S. Co.), Regina Margherita, Elettrico, Candia and Malta (Navigazione Generale). The armament of these vessels is 2 4·7-in. Q.F., and 4 1·4-in. M. A cruiser of 1100 tons displacement, 7000 I.H.P., and 22 knots speed, is projected.

JAPAN.—Armoured Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position	Armour. Deck Plating.	Armament. Guns.†	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.					inches.	inches.	inches.			knots.	tons.	
b.	Chin-Yuen-Go (Ex. Chen Yuen)	S.	7400	308 5	59 0	20 0	2	6200	Stettin	1882	..	14	12	3	4 12-in. (Krupp), 2 5·9-in., 8 l., 8 M.	3	14	1000	250
a.c.	Chiyoda	S.	2450	308 0	42 6	14 0	2	5600	Clydebank	1889	..	4½	..	1-2	10 4·7-in. Q.F., 14 3-pr., 3 M.	3	17·5	420	300
b. / *b.*	Yashima / Fuji	S.	12,450	374 0	73 0	26 6	2	14,000	Elswick / Thames	1896	..	18—6 H. S.	14 H. S.	2½ H. S.	4 12-in., 10 6-in. Q.F., 14 3-pr., 10 2½-pr.	5 (4 sub)	18·0‡	1100	600
c.b.	Fu-Sö	I.	3718	220 0	48 0	18 4	2	3500	Thames	1877	..	7	9	..	4 9·4-in. (Krupp), 2 6·6-in., 4 l., 5 M.	..	13·2	360	386
a.c.	Hi-yei *	C.	2200	231 0	40 9	17 4	1	2490	Milford	1878	..	4½	..	..	3 6·6-in. (Krupp), 6 5·9-in., 4 M., 1 l.	..	13·0	280	308
„	Kon-go *	C.	2200	231 0	40 9	17 4	1	2450	Hull	1877	..	4½	..	..	3 6·6-in. (Krupp), 6 5.9-in., 4 M., 1 l.	..	13·7	280	308
c.d.s.	Ping-Yuen-Go (Ex. Ping-Yuen.)	S.	2000	200 0	40 0	16 0	2	2400	Foo Chow	1890	..	8	5	2	1 10·2-in. (Krupp), 2 5.9-in., 6 M.	4	11·0	350	250
a.c.	Riojo *	C.	2459	213 0	34 0	17 4	1	975	Thames	1864	..	4½	..	..	1 6-in. (Krupp)	..	9·0	350	306
b.	New ship	S.	14,850	438 0	75 6	27 3	2	14,500	Thames	Pro.	..	9-4 H. S.	14-6	3-5	4 12-in., 14 6-in. Q.F., 20 12-pr., 8 1·8-in., 4 1·4-in.	5 (4 sub)	18·0	700	741

* These are now used as training ships; they have no armour as against end-on fire, and no armoured deck. † All Q.F. guns and 12-in. for new ships are Armstrong. ‡ Fuji: trial, f.d. 18·58 knots.

JAPAN.—Cruising Ships, &c.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour: Gun position.	Armour: Deck.	Armament: Guns.	Armament: Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.				£	in.	in.			knots.	tons.	
g.v.	Akagi	S.	615	164 0	27 0	10 0	1	700	Japan	1889	..	..	..	1 8·2-in., 1 5·9-in., 2 1., 2 M.	..	13·0	..	113
t.g b.	Akasaki	S.	875	240 0	27 6	13 0	2	5500	Japan	1895	..	..	..	2 4·7-in. Q.F., 4 3-pr.	5	21·0	200	..
cr.	Akashi	S.	2700	306 9	40 0	16 4	2	8500	Japan (Yokosuka)	1895	327,000	..	2–1	2 6-in. Q.F. (Armstrong), 6 4·7-in. 12 3-pr. 4 M.	2	20·0	200	..
cr.	Akitsushima	”	3150	302 0	42 7	18 5	2	8400	Japan	1892	..	4½	3	4 6-in. Q.F., 6 4·7-in., 10 3-pr.	4	19·0	..	330
g.v.	Atago	S.	615	154 0	27 0	10 6	2	700	Japan	1887	..	..	..	1 8·2-in., 1 4·7-in., 2 M.	..	12·0	C0	113
”	Banjo	W.	656	154 0	25 0	12 0	1	590	Japan	1879	..	..	..	1 6-in., 2 4¾-in., 1 M.	..	10·0	107	115
cr.	Hashidate	S.	4277	295 0	50 10	21 2	2	5400	Japan	1891	..	12	2	1 12·5-in. (Canet), 11 4·7-in. Q.F., 5 6-pr., 11 3-pr., 6 M.	4	17·0	400	350
”	Itsukushima	”	4277	295 0	50 10	21 2	2	5400	La Seyne	1891	..							
g.v.	Iwaki	W.	700	147 0	25 0	11 0	1	700	Japan	1883	..	..	..	1 5·9-in., 2 4·7-in.	..	10·0	600	115
”	Idzumi (ex Esmeralda)	S.	2716	270 0	40 0	18 3	2	6500	Elswick	1878	..	22	5–1	2 10 2-in. (Armstrong), 6 4·7-in. Q.F., 2 1. 6 M.	3	18	400	300
t.c.	Katsuraki / Musashi	S.	1476	206 9	36 0	15 0	2	1600	Japan	1885	..	..	..	2 6-in. (Krupp), 5 4·7-in., 2 M.	2	13·0	..	242
g.v.	Maya	S.	615	154 0	27 0	10 0	2	700	Japan	1886	..	..	..	1 8 2-in., 1 4 7-in., 2 M.	..	13·0	60	113
c.d.s.	Matsushima	S.	4277	295 0	50 10	21 2	2	5400	La Seyne	1890	..	12	2	1 12·5-in. (Canet), 11 4 7-in. Q.F., 5 6-pr., 11 3-pr., 6 M.	4	17·5	400	350
cr.	Miyaka	S.	1800	314 9	36 0	13 2	2	6130	..	Bldg.	..	..	..	2 4·7-in. Q.F., 10 1·8-in.	2	20·0	..	..
”	Naniwa	S.	3650	300 0	46 0	18 6	2	7235	Elswick	1885	..	1½	3–2	2 10·2-in. (Armstrong), 6 5 9-in. (Krupp), 2 3-pr. 10 M.	4	18·72	800	350
g.v.	Oshima	S.	630	164 0	27 0	10 0	1	700	Japan	1890	..	..	..	4 4·7-in., Q.F., 8 1.	..	13 0	..	..
cr.	Sai yen (ex Tsi Yuen)	S.	2300	263 3	33 0	15 9	2	2800	Stettin	1883	..	9	3	2 8·2-in., 1 5·9-in., 4 1. 10 M.	4	14·5	230	200

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in	ft. in.	ft. in.	no.				£	inches.	inches.			knots.	tons.	
cr.	Sei-ki	W.	900	200 0	30 6	14 2	1	720	Japan	1875	..	..	..	1 5·9-in., 4 4·7 Q.F., 2 M.	..	11·0	130	..
to.g.b.	Shirane	S.	875	240 0	27 6	13 0	2	5500	Japan	1896	..	..	..	2 4·7-in. Q.F., 4 3-pr.	5	21·0	200	..
cr.	Suma	S.	2700	306 9	40 0	16 4	2	8500	Japan (Yokosuka)	1896	237,000	..	2–1	2 6-in. Q.F., 6 4·7-in., 12 3-pr., 4 M.	2	20·0	200	..
"	Takao	S.&W.	1774	230 0	33 0	13 0	2	2330	Japan	1888	..	..	..	4 6-in. Q.F., 1 4¾-in. do., 6 M..		15·0	300	255
"	Takachiho	S.	3700	300 0	46 0	18 6	2	7500	Elswick	1885	..	1½	3–2	2 10·2-in. (Armstrong), 6 5·9-in., 2 3-pr., 10 M.	4	18·7	800	365
to.g.b.	Tatsuta	S.	875	240 0	27 6	13 0	2	5500	Elswick	1894	..	..	..	2 4·7-in. Q.F., 4 3-pdr.	5	21·0	200	..
"	Ten-riu	W.	1500	200 0	32 0	16 5	1	1250	Japan	1882	..	..	..	1 6·6-in. (Krupp), 6 4·7-in., 2 l.	..	12·0	256	222
cr.	Tsukushi (*ex* Arturo Prat)	S.	1350	210 0	32 0	15 0	2	2887	Elswick	1882	..	4½	..	2 10-in. (Armstrong), 4 4·7-in. Q.F., 2 l., 4 M.	2	16·5	250	190
"	Yayeyama	S.	1600	315 0	34 6	15 0	2	5400	Japan	1889	..	..	..	3 4·7-in. Q.F., 6 M.	2	20·0	..	200
"	Yamato	..	1476	206 9	36 0	15 0	1	1600	Japan	1885	..	..	..	2 6·6-in. (Krupp), 5 4·7-in., 4 M.	2	13·0	..	242
"	Yoshino	S.	4150	350 0	46 6	17 0	2	15,000	Elswick	1892	..	4½	4½–1¾	4 6-in. Q.F., 8 4·7-in., 22 3-pr.	5	23·0	1000*	300
"	Two New (Yoshino type)	S.	4760	396 0	49 0	17 7	2	15,500	Ph'delphia / SanFr'cisco	B'dg.	205,200	4½	4½–1¾	2 8-in., 10 4·7-in. Q.F., 12 12-pr., 2 6-pr., 2 2½-pr.	5	22·5	..	..
"	One unnamed	S.	4150	360 0	46 6	17 0	..	..	Elswick	Bldg.	..	..	..	2 8-in. Q.F., 10 4·7-in., 16 3-pr.	5	24	1000*	..

A further Naval Programme, extending over ten years, is in contemplation.

The gunboats Chen-Pei, Chen Pien, Chen Nan, Chen Hsi, Chen Chung and Chen Tung (440 tons) were captured from the Chine e.

* Bunker capacity.

NETHERLANDS.—Armoured Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Maximum Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour.			Armament.		Speed.	Normal Coal Supply.	Complement.
															Belt.	Turret.	Deck Plating.	Guns.	Torpedo Tubes.			
			metric tons.	ft.	in.	ft.	in.	ft.	in.	no					inches.	inches.	inches.			knts.	tons.	
c.d.s.t.	Bloedhond	I.	1683	182	8	46	3	10	6	2	680	Amsterdam .	1869	..	5½	9½	1	1 11-in. 28-ton (Krupp), 1 2·9-in., 2 3-pr. Q.F., 2 M.	..	7·7	104	118
„	Cerberus	I.	1584	185	8	44	0	9	9	2	534	Amsterdam .	1869	..	5½	9½	1	1 11-in. 28-ton (Krupp), 1 2·9-in., 2 3-pr. Q.F., 2 M	..	7·0	80	118
„	Draak	I.	2234	213	6	49	2	12	0	2	807	Amsterdam .	1877	..	8	11	1	2 11-in. (Krupp), 1 2·9-in., 2 3-pr. Q.F., 2 M.	..	8·0	100	133
„	Evertsen	S.	3400	282	9	47	0	16	9	2	4735	Flushing .	1894	..	6 H.S.	9½ H.S.	2	3 8·2-in., 2 5·9-in., 6 2 9-in. Q.F., 8 1·4-in.	3	16·0	280	260
„	Haai	I.	1580	195	2	44	0	9	6	2	672	Rotterdam	1871	..	5½	9½	1	1 11-in. 28-ton (Krupp), 1 2·9-in., 2 3-pr. Q.F., 2 M.	..	8·0	76	118
„	Heiligerlee . . .	I.	1543	187	0	44	0	9	6	2	630	Birkenhead .	1868	..	5½	9½	1	1 11-in. 28-ton (Krupp), 1 2·9-in., 2 3-pr. Q.F., 2 M.	..	9·0	120	118
„	Hyena	I.	1580	192	2	44	0	9	6	2	654	Amsterdam .	1870	..	5½	9½	1	1 11-in. 28-ton (Krupp), 1 2·9-in., 2 3-pr. Q.F., 2 M.	..	7·0	76	118
a.g.b.	Isala	I.	383	159	4	25	0	4	5	2	306	Amsterdam .	1876	..	5	5	1	2 4·7-in. (Krupp) . . .	..	7·7	28	44
t.	Koning der Nederlanden (I)	I.	5400	279	9	49	9	19	8	2	4500	Amsterdam .	1874	..	7½	9½	⅜	4 11-in., 4 4·7-in., 2 2·9-in., 6 1·4-in., 4 1·4 in. Q.F.	..	12·0	520	308
t. & b.	Koningin Wilhelmina der Nederlanden	S. shd.	4600	327	5	48	10	20	0	2	5900	Amsterdam .	1892	..	..	11	3	1 11-in., 1 8 2-in., 2 6·6-in., 2 2·9-in., 4 2 9-in. Q.F., 4 1·4-in., 6 1·4-in. Q.F., 2 M.	4	16·5	448	274
c.d s t.	Kortenaer. . . .	S.	3400	282	9	46	11	16	9	2	4658	Amsterdam .	1894	..	6 H.S.	9½ H.S.	2	3 8·2-in., 2 5·9-in., 6 2·9-in. Q.F., 8 1·4-in.	3	16·0	280	260
„	Krokodil	I.	1547	187	0	44	0	9	8	2	630	Birkenhead .	1868	..	5½	9½	1	1 11-in. 28-ton (Krupp), 1 2·9-in., 2 3-pr. Q.F., 2 M.	..	9·0	120	118
„	Luipaard	I.	1610	194	9	44	0	9	7	2	680	Rotterdam .	1876	..	5½	9½	1	1 11-in. 28-ton (Krupp), 1 2·9-in., 2 3-pdr. Q.F., 2 M.	..	9.0	120	118

NETHERLANDS.—Armoured Ships—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Maximum Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour.			Armament.		Speed.	Normal Coal Supply.	Complement.
															Belt.	Gun Position	Deck Plating.	Guns.	Torpedo Tubes.			
			metric tons.	ft.	in.	ft.	in.	ft.	in.	no.					inches.	inches.	inches.			knts.	tons.	
c.d.s.t.	Matador	I.	2000	209	6	47	3	10	6	2	691	Rotterdam .	1878	..	5½	11	..	2 11-in. 28-ton (Krupp), 1 2 9-in., 2 3-pr. Q.F., 2 M.	..	7·5	100	130
a.g.b.	Merva	I.	383	159	4	24	11	4	5	2	395	Amsterdam .	1879	..	5	5	1	2 4·7-in. (Krupp)	..	8·0	28	44
”	Mosa	I.	373	159	6	24	11	4	5	2	400	Amsterdam .	1878	..	5	5	1	2 4·7-in. (Krupp)	..	8·0	28	44
b. Ram	New Ships (A 4, A 5, A 6)*	S.	3936	272	6	49	10	17	8	2	5300	..	Pro.	..	6	9½	2½	3 9·4-in., 4 4·7-in. Q.F., 6 2·9-in. Q.F., 8 1·4-in.	?	16·0	250	..
c.d.s.t.	Panter	I.	1580	159	3	44	0	9	6	2	560	Amsterdam .	1870	..	5½	9½	..	1 11-in. 28-ton (Krupp), 1 2·9-in. 2 3-pr. Q.F., 2 M.	..	7·0	76	118
c.d.s.t.	Piet-Hein . . .	S.	3400	282	9	46	11	16	9	2	4736 (*t*)	Rotterdam .	1894	..	6 H.S.	9½ H.S.	2	3 8·2-in., 2 5·9-in., 6 2·9-in., Q.F., 8 1.4-in.	3	16·2 (*t*)	280	260
t.	Prins Hendrik der Nederlanden	I.	3375	240	0	44	0	17	10	2	2000	Birkenhead .	1866	..	4½	10	⅝	4 9-in. 13-ton M.L.R. (Armstrong). 4 4·7-in. (Krupp), 2 2·9-in., 4 1·4-in. Q.F., 6 M.	..	11·0	380	228
t. & b.	Reinier Claeszen . .	S.	2479	229	5	44	4	15	0	2	350	Amsterdam .	1891	..	4¾–2 *comp.*	11	3	1 8·2-in. (Krupp), 1 6·6-in., 1 2·9-in., 4 1·9-in. Q.F., 3 1·4-in.,	2	12·5	88	160
a.g.b.	Rhenus	I.	388	160	5	25	0	4	6	2	310	Amsterdam .	1877	..	5	5	1	2 4·7-in. (Krupp) . . .	..	7·5	28	44
c.d.s.t.	Schorpioen . . .	I.	2235	205	0	38	0	16	6	2	2225	La Seyne .	1868	..	6	11	1	1 11-in. 28-ton (Krupp), 2 2·9-in., 5 3-pr. Q.F., 2 M.	..	13·0	200	160
”	Stier	I.	2112	205	0	38	0	16	4	2	2250	Birkenhead .	1868	..	11	8	1	1 11-in. 28-ton (Krupp), 2 2·9-in., 5 3-pr. Q.F., 2 M.	..	12·4	160	154
a.g.b	Vahalis	I.	365	126	0	27	9	5	3	2	240	Rotterdam .	1870	..	4	1	½	2 3-pr. Q.F.	..	7·0	24	34
c.d.s.t	Wesp	I.	1580	195	2	44	0	9	6	2	740	Amsterdam .	1871	..	5½	9½	1	1 11-in. 28-ton (Krupp), 1 2·9-in., 2 3-pr. Q.F., 2 M.	..	8·0	76	118

* Three other armoured rams, Evertsen type, are projected.

NETHERLANDS.—Cruising Ships.

((I) denotes vessels of the Dutch Indian Navy.)

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft. in.	ft. in.	ft. in.	no.				£	inches.	inches.			knots.	tons.	
cr	Alkmaar	Cp. shd.	1068	178 9	30 2	15 7	1	686	Amsterdam	1874	..	..	..	1 5·9-in. (Krupp), 6 4·7-in., 1 2·9-in., 4 1·4-in. Q.F., 2 M.	..	10·0	130	112
1st cl. cr.	Atjeh	I. & W.	3440	301 0	41 0	21 4	1	2700	Amsterdam	1876	..	..	..	6 6·6-in. 6-ton, 8 4·7-in. (Krupp), 2 2·9-in., 8 3-pr. Q.F., 8 smaller.	..	13·5	440	301
g. v.	Bali (I)	I. & W. shd.	853	175 9	29 6	21 1	1	400	Rotterdam	1878	..	..	..	1 5·9-in., 3 4·7-in. (Krupp), 1 2·9-in., 2 1·4-in. Q.F.	..	9·0	80	104
"	Batavia (I)	I. & W. shd.	850	175 6	29 6	11 10	1	400	Amsterdam	1876	..	..	..	1 7-in. 7-ton M.L.R. (Armstrong), 2 4·7-in. (Krupp), 1 2·9-in., 2 1·4-in. Q.F.	..	9·0	95	104
"	Bellona	I.	920	178 5	32 9	12 6	1	310	Amsterdam	1892	..	..	..	1 5·9-in., 7 4·7-in., 3 2·9-in., 13 smaller.	..	8·5	50	87
"	Benkoelen (I)	I. & W. shd.	853	147 7	29 6	11 10	1	446	Rotterdam	1879	..	..	..	1 5·9-in., 3 4·7-in. (Krupp), 1 2·9-in., 2 1·4-in. Q.F.	..	9·5	100	99
"	Bonaire	I. & W. shd.	853	175 6	29 6	12 7	1	412	Rotterdam	1877	..	..	..	1 5·9-in., 2 4·7-in. (Krupp), 1 2·9-in., 2 1·4-in. Q.F., 2 M.	..	9·0	104	84
"	Borneo (I)	Cp. shd.	800	176 6	31 0	13 4	1	1040	Glasgow	1892	..	..	..	6 4·1-in., 1 2·9-in., 2 1·4-in. Q.F., 2 M.	..	13·0	124	106
"	Ceram (I)	S. & W. shd.	550	173 2	25 7	10 3	1	800	Flushing	1887	..	..	..	3 4·7-in. (Krupp), 1 2·9-in., 2 1·4-in. Q.F.	..	12·5	70	82
"	Condor (I)	Cp. shd.	350	126 0	20 0	10 0	1	300	Amsterdam	1885	..	..	..	1 2·3-in., 2 2-in.	..	10·0	26	40
1st cl. cr.	De Ruyter	I. & W. shd.	3517	302 1	41 0	22 1	1	3300	Amsterdam	1880	..	..	..	6 6·6-in. 6-ton, 8 4·7-in. (Krupp), 2 2·9-in., 8 3-pr. Q.F., 8 smaller.	..	14·5	360	30
g. v.	Edi (I)	S.	810	166 0	30 9	11 9	2	1100	Flushing	Bldg.	..	..	..	3 4·7-in. Q.F., 2 2·9-in., 4 1·4-in.	..	13·0	113	95
g. v.	Flores (I)	S. & W. shd.	550	173 2	25 7	11 4	1	650	Amsterdam	1887	..	..	..	3 4·7-in, 1 2·9-in., 2 1·4-in. Q.F.	..	11·7	75	82
cr.	Friesland	S.	3900	306 0	48 6	17 8	2	9250	Rotterdam	1896	285,700	..	2	2 5·9-in. Q.F., 6 4·7-in., 4 2·9-in., 8 1·4-in., 4 smaller.	4	20·0	400	306

NETHERLANDS.—Cruising Ships—*continued.*

((I) denotes vessels of the Dutch Indian Navy.)

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft. in.	ft. in.	ft. in.	no.				£	inches.	inches.			knots.	tons.	
cr.	Holland	S.	3900	306 0	48 6	17 8	2	9250	Amsterdam	1896	285,700	..	2	2 5·9-in. Q.F., 6 4·7-in., 4 2·9-in., 8 1·4-in., 4 M.	4	20·0	400	306
g.v.	Java (I)	I. & W. shd.	1300	205 4	31 2	14 1	1	1050	Rotterdam	1885	..	..	..	1 5.9-in., 3 4·7-in., 1 2·9-in., 2 1·4-in. Q.F.	..	12·5	160	114
1st cl. cr.	Johan Willem Friso	I. & W. shd.	3732	302 1	41 4	22 8	1	3133	Amsterdam	1886	..	..	..	6 6·6-in. 6-ton (Krupp), 8 4·7-in., 2 2·9-in., 8 3-pr. Q.F., 8 M.	2	14·5	400	301
1st cl. cr.	Koningin Emma der Nederlanden	I. & W. shd.	3528	301 0	41 0	21 4	1	2730	Amsterdam	1879	..	..	..	6 6·6-in. 6-ton, 8 4·7-in. (Krupp), 2 2·9-in., 8 3-pr. Q.F., 8 M.	..	14·0	470	301
g.v.	Lombok (I)	S. & W. shd.	600	172 0	27 3	11 0	1	990	Amsterdam	1891	..	..	..	3 4·7-in., 1 2·9-in., 2 3-pr. Q.F.	..	12·0	55	87
„	Makasser (I)	I. & W. shd.	850	177 0	29 6	11 10	1	320	Amsterdam	1877	..	..	..	1 6.3-in. 7-ton M.L.R. (Armstrong), 2 4·7-in. (Krupp), 1 2·9-in., 2 1·4-in. Q.F.	..	8·5	96	104
„	Madura (I)	I. & W. shd.	853	177 0	29 6	11 10	1	400	Amsterdam	1880	..	..	..	1 5·9-in., 3 4·7-in. (Krupp), 1 2·9-in., 2 1·4-in. Q.F.	..	9·0	85	104
„	Mataram (I)	S.	810	166 0	30 9	11 9	2	1100	Amsterdam	1896	..	..	..	3 4·7-in. Q.F., 2 3-in., 2 1·4-in.	..	13·0	113	95
„	Nias (I)	S.	810	166 0	30 9	11 9	2	1227	Amsterdam (Huygens)	1895	..	..	..	3 4·7-in. Q.F., 2 2·9-in., 4 1·4-in.	..	13·0	120	95
„	Padang (I)	I. & W. shd.	853	176 6	29 6	11 10	1	400	Rotterdam	1878	..	..	..	1 5·9-in., 3 4·7-in. (Krupp), 1 2·9-in., 2 1·4-in. Q.F.	..	9·0	80	104
„	Pelikaan (I)	S. & W. shd.	400	131 2	24 1	8 8	..	485	Rotterdam	1891	..	..	..	3 4·7-in. Q.F., 1 3-in., 2 3-pr. do.	..	11·35	43	40
„	Pontianak (I)	C. shd.	730	163 8	30 3	11 9	1	360	Amsterdam	1873	..	..	..	1 6·3-in. 7-ton M.L.R. (Armstrong), 2 4·7-in. (Krupp), 1 2·9-in., 2 1·4-in. Q.F.	..	9·5	90	104
„	Sambas (I)	C.	654	137 10	28 10	11 10	1	374	Rotterdam	1874	..	..	..	1 7-in. 7-ton M.L.R. (Armstrong), 2 4·7-in. (Krupp), 1 2.9-in., 1 1·4-in. Q.F.	..	8·5	85	100
„	Serdang (I)	S	810	166 0	30 9	11 9	2	1100	Flushing	Bldg.	..	..	..	3 4·7-in. Q.F., 2 2·9-in., 4 1·4-in.	..	13·0	113	95
sl.	Sommelsdijk	I. & W. shd.	1013	178 5	31 0	14 0	1	700	Amsterdam	1881	..	..	..	1 5·9-in., 3 4·7-in. (Krupp), 1 2·9-in.	..	10·0	150	88
cr.	Sumatra (I)	S.	1720	229 6	37 0	14 0	2	3750	Amsterdam	1890	..	..	1½	1 8·2-in., 1 5·9-in., 2 4·7-in., 1 2·9-in., 4 3-pr. Q.F., 2 M.	2	17·0	225	183
g.v.	Sumbawa (I)	S.	600	174 6	26 6	11 4	1	930	Flushing	1891	..	..	..	3 4·7-in., 1 2·9-in., 2 3-pr. Q.F.	..	12·5	60	87
„	Suriname	I. & W. shd.	884	177 0	29 6	11 5	1	440	Amsterdam	1877	..	..	..	1 5·9-in. (Krupp), 2 4·7-in., 1 2·9-in., 2 1·4-in. Q.F., 3 M.	..	9·0	105	84
1st cl. cr.	Tromp	I. & W. shd.	3512	301 0	41 0	21 4	1	2772	Amsterdam	1877	..	..	..	6 6·6-in. 6-ton, 8 4·7-in. (Krupp), 2 2·9-in., 6 3-pr. Q.F., 2 M.	..	14·0	470	301
1st cl. cr.	Van Speyk	I. & W. shd.	3728	302 1	41 0	23 0	1	2891	Amsterdam	1880	..	..	..	6 6·6-in. 6-ton, 8 4·7-in. (Krupp), 2 2·9-in., 6 3-pr. Q.F., 2 M.	..	14·0	360	301
cr.	Zeeland	S.	3900	306 0	48 6	17 8	2	9250	Flushing	Bldg.	285,700	..	2	2 5·9-in. Q.F., 6 4·7-in., 4 2·9-in., 8 1·4-in., 4 M.	4	20·0	400	306
g.v.	Zwaluw (I)	I. & W. shd.	340	126 0	20 0	10 0	1	240	Flushing	1882	..	..	..	2 3-in., 2 2-in.	..	10·0	26	40

Gun-vessels of the Indian Navy, Arend, Flamingo, Raaf, Reiger, Valk, Zeeduif, and Zwaan (400 tons), launched between 1880 and 1891; Glatik (417 tons), 1894; Argus and Cycloop (438 tons), 1893; Sindoro and Soembing (642 tons), built at Soerabaia, 1877–78.

Sixteen Gunboats (*Staunch class*) of 268 tons, and of 100 to 171 H.P.; also *five small gunboats*, of 210 tons, and 124 to 174 H.P., and *one steel gunboat* of 108 tons and 172 I.H.P. The new programme provides for the building of *twenty-two gun vessels* and despatch boats for the defence of the Zuyder Zee and Hollandisch Diep.

In addition to the ships indicated in the lists above, the programme, which extends to the year 1909, includes *six monitors* of two types, *six protected cruisers* (*Holland type*), *fifteen gunboats*, and *thirty-one torpedo craft*.

NORWAY.—Armoured Ships.

Class.	NAME	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position	Armour. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.				£	in.	in.	in.			knots.	tons.	
c.s., t.	Mjölner	I.	1515	203 5	45 11	11 10	1	450	Norrkoping	1868	66,800	5	12	1	2 4·7-in., 2 2·5-in. Q.F., 3 M., 1 l.	..	8·0	138	80
"	Harold Haarfagre / Torkensjold	S.	3500	280 0	48 6	16 6	2	3700	Low / Walker	1896 / Bldg.	190,000	7	8	..	2 8-in. Q.F., 6 4·7-in., 6 12-pr., 6 1½-pr.	2	16	..	..
"	Skorpionen	I.	1447	200 2	45 11	11 6	1	350	Horten	1866	..	5	12	1	2 4·7-in., 2 2·5-in. Q.F., 3 M., 1 l.	..	6·0	138	80
"	Thor	I.	2003	203 5	49 3	13 2	1	600	Horten	1872	..	7	14¼	1	2 4·7-in., 2 2·5-in. Q.F., 3 M., 1 l.	..	8·0	200	90
"	Thrudvang	I.	1515	200 2	45 11	11 10	1	500	Horten	1867	..	5	12	1	2 4·7-in., 2 2·5-in. Q.F., 3 M., 1 l.	..	8·0	138	80

Cruising Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.				£	in.	in.			knots.	tons.	
g.b.	Æger	S.	393	108 6	29 6	8 0	2	450	Horten	1892	..	..	1½	1 8·2-in., 1 2·7-in. Q.F., 2 1·9-in.	..	9·0	..	..
g.v.	Ellida	W.	1000	187 0	32 8	14 4	2	900	Horten	1880	..	..	..	5 5·9-in. 4-ton (Krupp), 1 4·7-in., 1 l., 2 M.	1	12·0	97	128
"	Frithjof	S.	1371	216 6	32 10	13 3	2	300	..	Bldg.	..	..	..	2 4·7-in. 4 2·9-in. Q.F., 4 1·4-in., 2 l.	3 (1 sub.)	..	..	..
"	Heimdal	S.	630	167 3	26 9	11 8	1	700	Christiania	1892	..	..	..	4 2·5-in. Q.F.	..	12·0	22	..
corv.	Nord Stjernen	W.	1609	216 6	39 4	17 9	1	800	Horten	1862	..	..	..	6 6·2-in. 3-ton M.L.R., 10 8-in. smooth-bore, 3 l.	..	9·0	195	216
g.v.	Sleipner	I.	580	173 10	25 11	9 6	2	800	Horten	1877	..	..	..	1 10·2-in. 22-ton (Krupp), 1 5.9-in. 4-ton do., 1 M.	1	12·0	80	87
to g.b.	Valkyrien	S.	380	190 0	24 2	9 2	2	3300	Elbing	1896	..	..	..	2 2·7-in. Q.F., 1 M.	2	23·2t	..	..
g.v.	Viking	S.	1113	203 6	30 6	13 0	2	2000	Horten	1891	..	..	1½	2 5·9-in. (Arms.), 4 2·5-in Q.F., 4 1·4-in., 2 M.	3	15·0	140	..

Eleven Gunboats, of 189 to 280 tons, and of 180 to 450 I.HP., armed with one large gun and machine guns in each.
Sixteen smaller Gunboats, of 60 tons, 70 I.HP., and 7½ knots speed; each armed with one 5½-inch gun. Also several smaller gunboats.
A first-class gunboat, No. 4, of 395 tons, in hand.

PORTUGAL.—Armoured Ship.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Battery.	Armour. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft. in.	ft. in.	ft. in.	no.				£	inches.	inches.	inches.			knots	tons.	
c.b.	Vasco da Gama . .	I.	2422	200 0	40 0	18 0	2	3600	Blackwall .	1876	132,000	9	10	3	2 10·2-in. 18-ton (Krupp), 1 5·9-in., 2 2·5-in., Q.F., 2 M.	..	13·2	280	218

Cruising Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft. in.	ft. in.	ft. in.	no.				£	in.	in.			knots.	tons.	
cr.	Adamastor . .	S.	1993	250 0	35 0	14 0	2	4000	Leghorn .	1896	..	5	..	2 5·9-in. Q.F., 4 4·7-in., 2 2·2-in., 4 M.	3	17·5	..	..
corv.	Affonso de Albuquerque	I. & W.	1111	203 0	33 0	13 6	1	1360	Blackwall .	1884	56,500	..	..	2 6-in. (Armstrong), 5 4·7-in. 2 2·5-in. Q.F., 2 M.	..	13·3	140	183
„	Bartholomeu Dias .	W.	2377	207 0	37 5	20 6	1	400 (nom.)	Blackwall .	1858	..	..	..	8 5-in.	..	10·0	360	271
g.v.	Bengo	I. & W.	462	125 6	24 6	9 0	1	400	Birkenhead .	1879	22,500	..	..	1 6-in., 2 3·4-in.	..	10·0	80	88
„	Diu	W.	729	147 0	27 6	13 0	1	700	Lisbon. .	1889	..	..	..	1 5·9-in. (Krupp), 2 4 7-in., 1 3 pr. Q.F., 2 M.	..	12·0	80	114
cr.	Dom Carlos I. .	S.	4100	330 0	43 0	17 6	..	14,500	Elswick .	Bldg.	..	..	4½	4 6-in. Q.F. (Armstrong), 8 4·7-in., 12 3-pr., 6 1-pr., 4 M.	5 (3sub.)	22·0	770	..
g.v.	Dom Luiz I. . .	S.	721	151 0	27 3	13 8	2	..	Lisbon. .	1895	..	..	..	4 4·1-in., 3 2·5-in. Q.F., 3 M..	..	11·0	100	..
	Douro	W.	587	142 9	26 0	11 0	1	400	Lisbon. .	1873	..	..	..	1 5 9-in. 4-ton, 2 4·7-in., 1 M.	..	10·0	85	107
„										1877								

PORTUGAL.—Cruising Ships—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. D.ck.	Armament. Guns.	Armament. Torpedo Tub-s.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft. in.	ft. in.	ft. in.	no.				£	in.	in.			knots.	tons.	
corv.	Duque da Terceira (training)	W.	1430	179 6	34 0	15 6	1	660	Lisbon	1864	..	..	..	2 4·7-in., 2 2·5-in. Q.F., 1 M.	..	9·0	130	178
g.v.	Liberal	I. shd.	580	140 0	25 6	10 6	1	580	Birkenhead	1884	32,500	..	..	1 6-in. 4-ton (Armstrong), 3 4-in., 2 M.	..	11·0	90	109
corv.	Mindello	C.	1124	170 0	35 9	14 0	1	900	Blackwall	1876	74,500	..	..	2 7-in. 4-ton M.L.R. (Armstrong), 4·47-in. 2 M.	..	11·5	130	169
g.v.	Mandovi	I. shd.	462	125 6	24 6	9 0	1	400	Birkenhead	1879	22,500	..	..	1 5·9-in., 2 3·4-in., 2 M.	..	10·0	80	86
”	Quanza	W.	587	142 9	26 0	11 0	1	500	Lisbon	1877	..	..	..	1 5·9-in. 4-ton, 2 4·7-in., 1 M.	..	10·0	85	107
corv.	Rainha de Portugal	C.	1124	170 0	35 9	14 0	1	900	Blackwall	1876	74,500	..	..	2 7-in. M.L.R. (Armstrong), 4 4·7-in., 2 M.	..	11·5	130	169
cr.	Rainha de Amelia	S.	1660	75 m.	11 m.	..	2	4500	Lisbon	Bldg	..	..	..	4 5·9-in., 4 3·9-in., 2 3-pr., 6 M.	2	17·5	..	..
g.v.	Rio Ave	W.	378	120 0	22 0	10 6	1	180	Lisbon	1880	..	..	..	1 4·7-in. (Armstrong), 2 3-in.	..	8·0	60	90
”	Rio Lima	I. shd.	638	148 6	27 6	10 6	1	500	Birkenhead	1875	33,000	..	..	1 7-in. 4-ton (Armstrong), 4 4-in., 2 M.	..	11·0	100	109
”	Sado	C.	645	148 6	28 0	10 6	1	500	Birkenhead	1875	35,500	..	..	1 7-in. 4-ton (Armstrong), 4 4·7-in., 1 M.	..	11·0	100	109
”	San Salvador	S.	721	151 0	27 3	13 8	2	..	Lisbon	Bldg.	..	..	..	4 4·1-in., 3 5·2-in. Q.F., 3 M.	..	11·0	100	..
”	Tamega	C.	645	148 6	28 0	10 6	1	500	Birkenhead	1875	35,500	..	..	1 7-in. 4-ton (Armstrong), 4 4·7-in., 1 M.	..	11·0	100	109
”	Tejo	W.	587	142 9	26 0	11 0	1	400	Lisbon	1869	..	..	..	1 5·9-in. 4-ton, 2 4·7-in.	..	10·0	85	107
”	Vouga	W.	730	160 9	27 6	12 0	1	600	Lisbon	1882	..	..	..	4 4-in., 2 1·8-in. Q.F., 2 M.	..	10·0	100	109
”	Zaire	I. shd.	580	140 0	25 6	10 6	1	580	Birkenhead	1884	32,500	..	..	1 6-in. (Armstrong), 3 4-in. 2 M.	..	11·0	90	109
”	Zambeze	W.	641	143 0	25 9	12 0	1	500	Lisbon	1886	..	..	..	1 6-in. (Armsg.), 2 4-in., 2 M.	..	10·0	85	107
cr.	Two unnamed	S. shd.	1800	246 0	35 6	14* 3	2	2650	Havre	Bldg.	..	..	1½	2 5·9-in. (Canet), 4 4 7-in., 8 1·8-in., 2 M.	1	15·0	..	..
”	One unnamed	S.	4100	360 0	47 3	17 6	..	..	Elswick	Bldg.	..	..	..	4 6-in. Q.F., 8 4 7-in., 12 3-pr.	..	22	1000†	..

* Mean draught. † Bunker capacity.

Ten small Gunboats and about 29 light draught steel river-gunboats. Several other vessels are projected.

RUSSIA.—Armoured Ships.

(B.S., Black Sea Fleet.)

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position.	Armour. Deck Plating.	Armament. Guns. B.L.R. are of Russian Krupp pattern.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.				£	in.	in.	in.			knots.	tons.	
c.d.s., t.	Adm. Chichagoff	I.	3493	254 0	42 7	18 0	1	2060	St. Petersburg	1868	..	6	6	..	2 11-in. 28-ton, 4 4-pr., 6 Q.F., 4 1.	..	10·5	300	264
”	Adm. Greig	I.	3462	254 0	42 7	17 6	1	2031	St. Petersburg	1868	..	4½	6	..	3 11-in. 28-ton, 6 Q.F., 2 l.	..	10·0	300	280
”	Adm. Lazareff	I.	3462	254 0	43 0	17 6	1	2004	St. Petersburg	1867	..	4½	6	..	3 11-in. 28-ton, 6 Q.F., 4 l.	..	10·25	300	280
a.c.	Adm. Nachimoff	S. shd.	7782	333 0	61 0	25 0	2	8000	St. Petersburg	1885	572,000	10 comp.	8 comp.	3	8 8-in., 10 6-in., 10 Q.F., 4 3-pr., 6 M.	4	16·7	1200	567
c.d.s.	Adm. Oushakoff	S.	4126	265 0	52 6	17 0	2	5000	St. Petersburg	1893	410,000	10	7–8	3	2 9-in., 4 6-in. Q.F., 6 1·8-in. Q.F., 8 M.	4	16·0	400	318
”	Adm. Seniavin	S.	4126	265 0	52 6	17 0	2	5000	St. Petersburg	1894	410,000	10	7–8	3	2 9-in., 4 6-in. Q.F., 6 1·8-in., 8 1·4-in., M.	4	16·0	400	318
c.d.s., t.	Adm. Spiridoff	I.	3493	254 3	42 7	19 1	1	2007	St. Petersburg	1868	..	6	6	..	2 11-in. 28-ton, 4 4-pr., 6 Q.F., 4 l.	..	10·5	300	260
b.	Alexander II.	S. shd.	8440	326 0	67 0	23 0	2	8000	St. Petersburg	1887	..	14 comp.	10 comp.	2½	2 12-in. 50-ton, 4 9-in. 19-ton, 8 6-in., 4 6-pr. Q.F., 4 3-pr., 6 M.	5	16·5	1200	604
b.	Catherine II. (B.S.)	I. & S.	10,180	331 0	69 0	26 6	2	10,600	Nicolaieff	1886	900,000	16 comp.	14 comp.	3	6 12-in. (56-ton), 7 6-in., 8 6-pr. Q.F., 6 M.	7	15·5	886	325
c.d.s., t.	Charodeika	I.	1881	206 9	42 7	10 6	2	786	St. Petersburg	1867	..	4½	6	1	4 9-in., 2 Q.F. and 2 M.	..	8·0	250	171
a.c.	Dmitri Donskoi	S. shd.	5893	296 5	52 0	24 4	2	7000	St. Petersburg	1883	..	6	unard.	2½	2 8-in., 4 6-in. Q.F., 10 4·7-in. Q.F., 16 Q.F. and M., 4 l.	4	16·5	400	510
t.	Dvenadzat Apostoloff (Twelve Apostles) B.S.	S.	8076	330 0	60 0	25 6	2	11,500	Nicolaieff	1890	..	14 comp.	12 comp.	2½	4 12-in. 52-ton, 4 6-in., 8 3-pr. Q.F., 10 M.	6	16·6	800	500

RUSSIA.—Armoured Ships—*continued.*

(B.S., Black Sea Fleet.)

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position	Armour. Deck Plating.	Armament. Guns. B.L.R. are of Russian Krupp pattern.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft. in.	ft. in.	ft. in.					£	inches.	inches.	inches.			knots.	tons.	
t.	Gangoot	S.	6592	278 0	62 0	21 0	2	8300	St. Petersburg	1890	..	16 comp.	7·8	2½	1 12-in., 4 9-in., 4 6-in., 10 Q.F.	5	14·7	500	5 8
a.c.	General Admiral	I. shd.	4604	285 5	49 3	21 0	1	4472	St. Petersburg	1873	..	6	..	..	6 8-in., 2 6-in., 10 Q.F. and M., 5 l.	4	14·2	1000	312
c.d.s.	General Admiral Apraxine	S.	4126	265 0	52 6	17 0	2	5000	St. Petersburg (New Admiralty)	1896	..	10	7·8	3	2 9-in., 4 6-in., 6 1·8-in. Q.F., 8 1·4-in.	4	16·0	215	318
c.d.s	New Ship.									Bldg.									
a.c.	Gerzog Edinburgski	I. & W.	4604	285 5	49 3	21 0	1	5222	St. Petersburg	1875	..	6	6	..	4 8-in., 5 6-in., 12 Q.F., 6 l.	2	15·2	1000	500
b.	Georgi Pobiedonosetz (George the Victorious) B.S.	S.	10,280	320 0	69 0	26 7	2	10,600 13,468 (*t*)	Sebastopol	1892	431,000	16	12	..	6 12-in. 56-ton, 7 6-in., 8 3·9-in. Q.F., 6 M.	7	16·5	700	500
a.g.b.	Gremiastchy	S.	1500	225 0	41 0	11 0	2	2500	St. Petersburg	1892	..	5	..	1½	1 9-in., 1 6-in., 10 Q.F.	2	15·0	100	142
"	Grozjastchy	S.	1492	229 0	41 8	11 0	2	2000	St. Petersburg	1890	..	5	..	1½	1 9-in., 1 6-in., 8 Q.F.	2	15·0	100	120
"	Khrabry	S.	1492	229 0	41 7	11 0	2	2000	St. Petersburg (New Admiralty)	1895	..	5	..	1½	1 9-in., 1 6-in., 8 Q.F.	2	15·0	100	120
c.b.	Kniaz Pojarski	I.	5007	272 4	49 3	23 11	1	2835	St. Petersburg	1867	..	4½	4½	..	2 8-in., 2 6-in., 10 Q.F. and M., 4 l.	..	11·0	600	452
c.d.s., br.	Kreml	I.	3480	219 10	52 5	15 0	1	2822	St. Petersburg	1864	..	4½	4½	..	8 8-in., 6 6-in., 5 Q.F., 6 l.	..	9·0	..	63
a.c.	Minin	I.	5740	298 6	49 3	25 3	1	6000	St. Petersburg	1878 altd.	..	7	8	..	4 8-in., 12 6-in., 16 Q.F., 4 l.	..	14·0	1200	450
c.d.s., br.	Netron-Menya	I.	3494	219 10	53 0	15 6	1	1600*	St. Petersburg	1864	..	4½	4½	..	14 8-in., 4 Q.F., 2 M., 4 l.	1	9·0	500	63
t.	Navarin	S.	9476	338 0	67 0	25 0	2	9000	St. Petersburg	1891	772,995	16	12	..	4 12-in. 52-ton, 8 6-in., 14 Q.F. 4 l.	6	16·0	1200	..
t.	Nicolai I.	S. shd.	8440	326 0	67 0	23 0	2	8000	St. Petersburg	1888	453,000	14 comp.	10 tur. 6-in. b. comp.	2½	2 12-in. 52-ton, 4 9-in. 19-ton, 8 6-in., 12 Q.F., 8 M., 4 l.	6	14·8	..	604
cir. c.d.s.	Novgorod, B.S.	I. shd.	2706	101 0	101 0	13 0	6	2000	Nicolaieff	1873	..	9–7	9	..	2 11-in., 8 Q.F., 2 M., 2 l.	..	6·0	200	150
t.	Oslabya	S.	12,674	433 0	71 5	26 0	3	14,500	St. Petersburg (New Admiralty)	Bldg.	..	9 H. S.	(?)	(?)	4 guns in 2 turrets, 30 others.	(?)	17·5	..	..
a.g.b.	Otvazny	S.	1500	225 0	41 0	11 0	2	2000 2589 (*t*)	St. Petersburg	1892	..	5	..	1½	1 9-in., 1 6-in., 10 Q.F.	2	15·0 15.5 (*t*)	100	142
a.c.	Pamyat Azova	S. shd.	6000	377 0	51 0	23 0	2	8000	St. Petersburg	1888	350,000	9 comp.	8 comp.	2½	2 8-in., 13 6-in., 14 Q.F., and 3 M.	7	18·8	1000	525
t.	Peresviet	S.	12,674	433 0	71 5	26 0	3	14,500	St. Petersburg	Bldg.	..	9 H.	(?)	(?)	4 guns in 2 turrets, 30 others.	(?)	17·5	..	..
c.d.s., br.	Pervenetz	I.	3279	219 10	52 5	14 9	1	1067	Blackwall	1863	..	4½	4½	..	6 8-in., 9 6-in., 7 Q.F., 8 l.	..	9·0	..	63
t.	Peter Veliky	I.	8749	328 2	62 4	23 9	2	8258	St. Petersburg	1872	..	14–8	8–6	3	4 12-in. 40-ton, 13 Q.F., 4 l.	1	14·5	1200	436
t.	Petropavlovsk	S.	10,960	367 6	69 0 70 0	26 0	2	10600	St. Petersburg	1894	1,098,000	15¾	10 H. S.	3½	4 12-in., 8 8-in., 24 Q.F.	6	17·5	900	..
t.	Poltava	S.	10,960	367 6	69 0	26 0	2	10,600	St. Petersburg	1894	1,098,000	15¾	10 H. S.	3½	4 12-in., 8 8-in., 24 Q.F.	6	17·5	900	..
a. c.	Rossia	S.	12,130	480 0	68 6	25 0	3	14,500	St. Petersburg	1896	..	10	..	2½	4 8-in., 16 6-in., 6 4·7-in. Q.F., 18 small Q.F. & M.	5	20·0	2500	725
a. c.	Rossia, enlarged	S.	14,000	..	..	..	..	..	St. Petersburg (Baltic)	Bldg	..	..	..	..	..	..	..	..	..
t.	Rostislav, B.S.	S.	8880	341 0	66 6	24 0	2	8,500	Nicolaieff	1896	..	15¾ comp.	15¾ comp.	2–3	4 10-in., 8 5·9-in. (Canet), 12 1·8-in. Q.F., 4 1·5-in., 2 M.	2–3	16·0	550 800	..
t.	New Ship, B.S.									Pro.									
a. c.	Rurik	S.	10,923	396 6	67 0	26 0	2	13,250	St. Petersburg	1894	..	10 comp.	..	2½	4 8-in., 16 6-in., 6 4·7-in. Q.F., 18 small Q.F. & M.	5	18·0	2000	768
t.	Sevastopol	S.	10,960	367 6	69 0	26 0	2	13,600	St. Petersburg	1895	1,098,000	15¾	10 H. S.	3½	4 12-in., 8 8-in., 24 Q.F.†	6	17·5	900	..

* To receive new boilers and liquid fuel stoking apparatus.

(*t*) On trial.

RUSSIA.—Armoured Ships—*continued.*

(B.S., Black Sea Fleet.)

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Maximum Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour.			Armament.		Speed	Normal Coal Supply.	Complement.
															Belt.	Gun Position	Deck Plating.	Guns. B.L.R. are of Russian Krupp pattern.	Torpedo Tubes.			
			tons.	ft.	in.	ft.	in.	ft.	in.	no				£	in.	in.	ins.			knots.	tons.	
b.	Sinope, B.S. . .	I. & S.	10,180	331	0	69	0	26	6	2	13000	Sebastopol .	1887	900,000	16 *comp.*	14 *comp.*	3	6 12-in. 50-ton, 7 6-in. 8 Q.F., 6 M.	7	16·75	886	325
t.	Sissoi Veliky (Sissoi the Great)	S.	8880	341	0	66	6	24	0	2	8500	St. Petersburg.	1894	796,333	15¾ *comp.*	15¾ *comp.*	3	4 12-in., 6 6-in. Q.F., 12 1·8-in., 4 1·4-in., 2 M.	6	16·0	550	..
b.	Tchesmé, B.S. . .	I. & S.	10,180	331	0	69	0	26	6	2	11000	Sebastopol .	1886	900,000	16 *comp.*	14 *comp.*	3	6 12-in. 50 ton, 7 6-in., 8 Q.F., 6 M.	7	15·0	886	325
"	Tria Sviatitelia, B.S.. (Three Saints.)	S.	12,480	357	6	72	2	27	0	2	10600	Nicolaieff .	1893	..	18–16	16	3	4 12-in., 12 6-in. Q.F., 4 4-in., 4 7-in., 56 smaller Q.F. & M.	6 2 sub.	16·0 18·0 (*t*)	1000	582
circular c.d.s.	Vice-Admiral Popoff, B.S.	I. shd.	3590	120	0	120	0	13	5	6	3066	Nicolaieff .	1875	..	16	16	..	2 12-in. 40-ton, 2 Q.F., 6 l. .	..	8·0	250	453
a.c.	Vladimir Monomach	S. shd.	5796	296	6	52	0	24	0	2	7000	St. Petersburg .	1882	..	6 *comp.*	..	2	4 8-in., 12 6-in., 18 Q.F. & M., 4 l.	2	15·2	400	550

Ten old Monitors of 1566 tons have been removed from this list:—Uragan, Tifon, Striletz, Edinorog, Koldun, Lava, Bronenosetz, Latnik, Perun, and Vieschun; and one of 1461 tons—Smerch.

RUSSIA.—Cruising Ships, &c.

(B.S., Black Sea Fleet.)

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Maximum Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft.	in.	ft.	in.	ft.	in.	no.				£		ins.			knots.	tons.	
to.g.b.	Abrek	S.	535	212	2	24	10	9	0	2	..	Abo	1896	*53,600	..	½	.. ..	2	21·0	..	..
2nd cl. cr.	Admiral Korniloff	S.& W.	5000	351	0	48	6	20	0	2	9000	St. Nazaire	1887	296,000	..	2½	2 8-in., 14 6-in., 6 1·8-in. Q.F., 6 1·4-in., 5 l.	6	17·5	1100	425
3rd cl. cr.	Afrika	I.	2852	285	5	39	4	17	1	1	1350	Chester, U.S.	1895 1877	..	..	..	3 6-in., 6 Q.F., 4 M., 4 l.	..	13·0	975	257
3rd cl. cr.	Asia	I.	2483	269	0	36	0	16	5	1	1100	Philadelphia	1878	..	..	..	2 6-in., 5 Q.F., 6 M., 5 l.	..	13·0	750	260
to g.b.	Bakan†	S. shd.	240	180	6	15	7	11	6	2	3800	St. Petersburg (Baltic)	1896	..	..	..	.. ..	..	..	..	..
g.v.	Bobr	S.	950	187	0	35	2	9	6	2	1150	Kretona	1884	43,000	..	..	1 9-in., 1 6-in., 5 Q.F., M., & 6 l.	..	12·0	..	..
to.g.b.	Captain Sacken, B.S.	S.	700	210	0	24	0	8	10	2	3400	Nicolaieff	1888	40,700	..	..	7 4·7-in. Q.F., 7 M.	6	18·5	97	120
g.v.	Chernomoretz, B.S.	S.	1224	210	0	35	0	11	1	1	2000	Nicolaieff	1889	40,000	..	..	2 8-in., 1 6-in., 7 Q.F. & M.	2	13·5	250	161
"	Coreetz	S.	1213	206	0	35	0	10	6	2	1500	Stockholm	1886	..	..	1½	2 8-in., 1 6-in., 2 Q.F., 4 l.	2	13·5	..	..
cr.	Diana	S.	6500	413	4	55	9	..		3	12500	St. Petersburg (Baltic)	Bldg.	..	..	2½	6 5·9-in. Q.F., 6 4·7-in., 27 smaller.	4	20·0	..	..
corv.	Djigit	I. & W.	1456	206	9	32	10	16	1	1	1700	St. Petersburg	1876	..	..	..	3 6-in., 8 Q.F. & M., & 4 l.	..	13·0	250	172
"	Donetz, B.S.	S.	1224	210	0	35	0	11	0	1	2000	Nicolaieff	1887	40,000	..	..	2 8-in., 1 6-in., 7 Q.F. & M.	2	13·5	250	161
to.g.b.	Gaidamak	S.	500	192	6	24	2	7	6	2	3000	Abo	1893	..	..	..	2 1·8-in. Q.F., 7 1·4-in., 10 M.	3	22·0	90	87
g.v.	Gilyak	S.	903	200	0	37	0	..		..	1000	St. Petersburg (New Admiralty)	1896	..	..	..	.. ..	..	12·0	..	..
to.g.b.	Griden, B.S.	S.	400	192	6	24	2	7	6	2	3500	..	1893	66,600	..	..	2 1·8-in. Q.F., 7 1·4-in., 10 M.	3	22·0	90	60
g.v.	Jermak	I.	706	154	3	26	3	11	2	1	125	St. Petersburg	1870	..	..	..	2 guns	..	..	..	..
to.g.b.	Kazarsky, B.S.	S.	411	190	0	24	0	8	6	2	3500	Elbing	1890	32,500	..	..	9 1·8-in. Q.F. (Hotchkiss)	2	23·0	90	60
corv.	Kreyzer	I. & W.	1542	206	9	32	10	16	1	1	1800	St. Petersburg	1875	..	..	..	2 6-in., 7 Q.F., 1 M., 4 l.	..	13·0	..	..
g.v.	Kubanetz, B.S.	S.	1221	210	0	35	0	11	0	1	1500	Sebastopol	1888	40,000	..	..	2 8-in., 1 6-in., 7 Q.F.	2	13·8	250	161
to.g.b.	Lieutenant Ilyen	S.	600	230	0	24	0	8	10	2	3500	St. Petersburg	1887	40,150	..	..	7 3-pr. Q.F., 10 M.	7	20·1	97	120

* Including armament. † Particulars doubtful.

RUSSIA.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Maximum Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft.	in.	ft.	in.	ft.	in.	No.				£	in.	in.			knots.	tons.	
g.v.	Mandjur	S.	1224	210	0	35	0	11	0	2	1400	Copenhagen	1886	..	..	1½	2 8-in., 1 6-in., 7 Q.F., M., & 4 l.	2	14·0	..	..
corv.	Nayezdnik	I. & W.	1334	206	9	32	10	14	0	1	1719	St. Petersburg	1878	..	..	..	3 6-in., 7 Q.F. & M., 4 l.	..	13·0	250	172
corv.	Oprichnik	S.& W.	1426	206	9	32	10	14	0	1	1268	St. Petersburg	1880	..	..	..	3 6-in., 7 Q.F. & M., 4 l.	..	13·0	230	172
cr.	Pallada	S.	6500	413	4	55	8	..		3	12500	St. Petersburg (Baltic)	Bldg.	..	..	2½	6 5·9-in. Q.F., 6 4·7-in., 27 smaller	4	20·0	..	..
2nd cl. *cr.*	Pamyat Merkuriya, B.S.	I. & S.	3050	295	0	41	0	17	0	1	3000	Toulon	1880	..	..	..	6 6-in., 8 Q.F. & M., 4 l.	2	16·0	1100	200
sl.	Plastun	I. & W.	1255	206	9	32	10	14	0	1	1268	St. Petersburg	1879	..	..	..	3 6-in., 7 Q.F. & M., & 4 l.	..	13·0	250	172
to.g.b.	Possadnik	S.	400	192	6	24	2	7	6	2	3600	Elbing	1892	111,000	..	..	2 1·8-in. Q.F., 7 1·4-in., 3 M.	3	22·0	90	87
corv.	Razboynik	I. & W.	1329	206	9	32	10	14	0	1	1786	St. Petersburg	1878	125,000	..	..	3 6-in., 7 Q.F. & M., & 4 l.	..	13·0	250	172
3rd cl. *cr.*	Rynda	S. shd.	2950	265	9	45	11	16	1	2	3000	St. Petersburg	1885	..	..	1½	10 6-in., 9 Q.F., M., & 4 l.	4	14·8	710	322
g.v.	Sivootch	S.	950	187	0	35	0	9	6	2	1125	Stockholm	1884	43,000	...	..	1 9-in., 1 6-in., 5 Q.F., M., & 6 l.	..	12·5	..	..
corv.	Strjelok	I. & W.	1343	206	9	32	10	14	0	1	1528	St. Petersburg	1880	..	..	..	3 6-in., 7 Q.F., M., & 4 l.	..	13·0	250	172
cr.	Svietlana	S.	3828	331	3	42	8	18	9	2	3828	Havre	1896	..	4	2	6 5·9 Q.F. (Canet), 10 1·8-in.	4	20·0	1000	..
g.v.	Teretz, B.S.	S.	1224	210	0	35	0	11	0	..	1500	Sebastopol	1888	40,000	..	..	2 8-in., 1 6-in., 7 Q.F. & M.	2	13·8	250	161
"	Uraletz, B.S.	S.	1224	210	0	35	0	11	0	..	1500	Sebastopol	1888	40,000	..	..	2 8-in., 1 6-in., 7 Q.F. & M.	2	13·8	250	161
to.g.b.	Voevoda	S.	400	192	6	24	2	7	6	2	3600	Elbing	1892	111,000	..	..	2 1·8-in. Q.F., 7 1·4-in., 3 M.	3	22·0	90	87
sl.	Vjestnik	I. & W.	1255	206	9	32	10	14	2	1	1268	St. Petersburg	1879	..	..	..	3 6-in., 7 Q.F. & M., & 4 l.	..	13·0	250	172
to.g.b.	Vzadnidk	S.	500	192	6	24	2	7	6	2	3000	Abo	1893	..	..	..	4 1 8-in. Q.F., 7 1 4-in. 10 M. & l.	3	22·0	250	172
sl.	Zabiyaka	I.	1234	219	10	29	6	14	9	1	1194	Philadelphia	1878	..	..	..	6 Q.F., 4 M., 5 l.	..	14·5	90	87
g.v.	Zaporojetz	S.	1200	210	0	35	0	10	0	2	1500	Nicolaieff	1887	40,000	..	..	2 8-in., 1 6-in., 7 Q.F. & M.	2	13·5	250	161

Baltic:—*Ten Gunboats, Staunch Class*, of 270 to 402 tons, 195 to 445 I.H.P., with 1 11-inch breech-loader, and 9 knots speed, and *two Gunboats* of about 180 tons and 7 knots speed. *Training Ships*, Bajan, Voin, Vierny (launched at the Baltic Works, St. Petersburg, November, 1895), and Moriak. Black Sea:—*Twelve Steamers (Gun-vessels, Despatch-vessels, &c.)* 90 to 298 tons. *Imperial Yachts*, Standart, Polarnaia Svezda, Tsarevna, &c.

Auxiliary Steamers.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Com-plement.
	BLACK SEA CO.		tons.	ft. in.	ft. in.	ft. in.					
Auxiliary Cruiser	Czar	S.	2340	319 0	37 0	23 6	1	350 nom.	Newcastle	1883	14
,,	Czarevna	,,	2340	319 0	37 0	23 6	1	350 nom.	,,	1883	14
,,	Czaritza	,,	2340	319 0	37 0	23 6	1	350 nom.	,,	1883	14
,,	Grand Duke Alexis	,,	2350	284 0	37 0	14 9	1	3500	Hebburn	1890	16
,,	Grand Duke Constantine	,,	2400	284 0	37 0	15 0	1	3500	,,	1891	16
,,	Grand Duke No. 1	,,	2400	288 0	37 0	15 0	1	2500	,,	Bldg.	14½
,,	Grand Duke No. 2	,,	2400	288 0	37 0	15 0	1	2500	,,	,,	14½
,,	Emperor Nicolas II.	,,	..	..	..	..	..	..	,,	1895	..
,,	Roumantzeff	,,	760	212 0	28 0	7 6	2	1000	,,	1894	13
	VOLUNTEER FLEET.										
,,	Ekaterinoslav	,,	10,500	440 0	49 6	24 0	2	3200	,,	1896	12
,,	Khabarovsk	I.	2700	265 0	36 0	14 6	2	1800	,,	1894	13
,,	Kherson†	S.	10,225	493 0	54 3	24 0	2	{12,500 / 13,150 (t.)*}	,,	1895	19½
,,	Kiev	,,	10,500	440 0	49 6	24 0	2	3200	Clydebank	1895	13
,,	Kostroma	I.	7975	360 0	42 0	23 6	1	2700	Hebburn	1888	14
,,	Moskva†	S.	10,225	493 0	54 3	24 0	2	12,500	,,	Bldg.	19½
,,	Nijni Novgorod	I.	7876	325 0	40 0	23 6	1	2000	Elswick	1891	11½
,,	Orel	,,	7990	445 0	48 0	23 6	2	10,000	Hebburn	1889	19
,,	Petersburg	,,	9500	460 0	52 0	24 0	2	11,000	,,	1894	19
,,	Poltava	S.	10,225	493 0	54 3	24 0	2	12,500	Dumbarton	Bldg.	1[illegible]½
,,	Saratoff	,,	8558	462 0	50 0	24 0	2	10,000	Glasgow	1892	19
,,	Tamboff	,,	8640	385 0	45 0	24 6	1	2,500	Dumbarton	1893	12¾
,,	Vladimir	,,	10,500	440 0	49 6	24 0	2	3,200	,,	1895	12
,,	Voronesh	,,	10,500	440 0	49 6	24 0	2	3,200	,,	1895	12
,,	Yaroslav	,,	8640	385 0	45 0	24 6	1	2,500	,,	1893	12¾

* Belleville boilers supplied by Maudslay. † Armament, 3 4·7-in. Q.F., 20 smaller. Three other ships of 10,000 tons, 20 knots, in hand.

SPAIN.—Armoured Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position	Armour. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.				£	in.	ins.	ins.			knots.	tons.	
a.c.b.	Almirante Oquendo .	S.	7000	340 0	65 0	21 6	2	13,000	Bilbao .	1891	600,000	12	10½	3	2 11-in., 10 5·5-in. (all Hontoria), 8 2·2-in. Q.F., 8 1·4-in., 2 M.	6	20·0	1200	500
„	Cardenal Cisneros .	S.	7000	347 10	61 0	21 10	2	15,000	Ferrol .	1896	600,000	12	10½	2	2 11-in., 10 5·5-in. Q.F., 2 2·7-in., 4 2·2-in., 4 1·4-in., 2 M.	8	20·0	1200	500
„	Cataluña . . .	S.	7000	347 10	61 0	21 10	2	15,000	Carthagena .	Bldg.	600,000	12	10½	2	2 11-in., 10 5·5-in. Q.F., 2 2·7-in., 4 2·2-in., 4 1·4-in., 2 M.	8	20·0	1200	484
a.c.	Cristobal Colon (ex Giuseppe Garibaldi II.)	S.	6840	328 0	59 8	24 0	2	14,000	Sestri Ponente	1896	..	6 H.S.	6 H.S.	1½	2 10-in., 10 6-in. Q.F., 6 4·7-in., 10 2·2-in., 10 1·4-in., 2 M.	4	20·0	1000	450
a.c.t.	Emperador Carlos V.	S.	9235	380 0	67 0	25 0	2	18,500	Cadiz (Vea Murguia)	1895	734,000	2	10	6½	2 11-in. (Hontoria), 8 5·5-in. Q.F., 4 3·9-in., 2 2·7-in., 4 2·2-in., 6 M.	6	20·0	1200	535
a.c.b.	Infanta Maria Teresa	S.	7000	340 0	65 0	21 6	2	13,758	Bilbao .	1890	600,000	12	10½	3	2 11-in., 10 5·5-in. (all Hontoria), 8 2·2-in. Q.F., 8 1·4-in., 2 M.	6	20·25	1200	500
br.	Numancia * . .	I.	7305	314 10	55 9	25 3	1	3708	La Seyne .	1863	315,600	5½	5	..	8 10-in. M.L.R. (Armstrong), 7 8-in., 1 7·8-in. (Hontoria), 8 M., 3 l.	2	8·0	1100	600
b.	Pelayo † . .	S.	9900	330 0	66 0	24 11	2	8000	La Seyne .	1887	..	17¾	19¼	4	2 12-5-in. 48-ton, 2 11-in. 38-ton, 1 6·2-in., 12 4·7-in., 6 Q.F., 12 M	7	16·0	800	600
a.c.	Pedro d'Aragon .	S.	6840	328 0	59 8	24 0	2	13,000	Sestri Pnente	Bldg.	..	6 H.S.	6 H.S.	1½	2 10-in., 10 6-in. Q.F., 6 4·7-in., 10 2·2-in., 10 1·4-in., 2 M.	4	20·0	1000	450
a.c.b.	Princesa de Asturias	S.	7000	347 10	61 0	21 10	2	15,000	Carraca .	1896	600,000	12	10½	2	2 11-in., 10 5·5-in. Q.F., 2 2·7-in., 4 2·2-in., 4 1·4-in., 2 M.	8	20·0	1200	500
c.s., t.	Puig-cerda . (Monitor) (torpedo training)	I.	553	127 11	29 6	6 7	2	328	Sa Seyne .	1874	..	4	4	9	1 6·2-in. (Palliser), 2 4·7-in. bronze smooth bores.	..	8·0	23	..
a.c.b.	Vizcaya . . .	..	7000	340 0	65 0	21 6	2	13,000	Bilbao .	1891	600,000	12	10½	3	2 11-in., 10 5.5-in. Q.F., 2 2·7-in., 8 12·2-in., 4 1·4-in. 2 M.	6	20·0 21·0 (*t*)	1200	500
br.	Vitoria (training) ‡ .	I.	7250	318 3	55 10	25 3	1	4500	Blackwall .	1865	..	5½	5	..	8 9-in. M.L.R. (Armstrong), 3 8-in., 1 7·8-in. (Hontoria), 8 M., 2 l.	2	11·0	875	561

* To receive new machinery and 6 6·2-in. Q.F., and 6 4·7-in. Q.F. (Hontoria).
† Is receiving new boilers at La Seyne, and 9 5·5-in. Q.F. instead of the 1 6·2-in. and the 12 4·7-in.
‡ Being furnished with fighting-masts and 5·5-in. Q.-F. guns at La Seyne.
A battleship of 11,000 tons is projected.

SPAIN.—Cruising Ships.

Class.	NAME.	Material.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.				£		ins.			knots.	tons.	
cr.	Alfonso XII.	S.	3090	278 10	42 7	16 5	1	4800	Ferrol	1887	..	..	..	6 6·2-in. (Hontoria), 2 2·7-in. 6 6-pr. Q.F., 4 3-pr., 5 M.	5	17·5	600	300
"	Alfonso XIII.	S.	5000	318 6	50 6	20 0	2	11,000	Ferrol	1891	..	..	4½	4 7·8-in. (Hontoria), 6 4·7-in., 6 2·2-in. Q.F., 6 1·4-in., 3 M.	5	20·0	1200	276
"	Aragon	W.	3342	246 0	45 11	20 11	1	4400	Carthagena	1879	..	..	..	6 6·2-in. (Hontoria), 2 3·3-in. (Krupp), 4 2·9-in., 2 M.	2	14·0	470	300
"	Castilla	W.	3342	246 0	45 11	20 11	1	4400	Cadiz	1881	..	..	..	4 5·9-in. (Krupp), 2 4·7-in., 2 3·3-in., 4 2·9-in., 8 Q.F., 2 M.	2	14·0	470	300
g.b.	General Concha	I.	524	157 5	25 7	8 7	2	600	Ferrol	1883	..	..	..	3 4·7-in. (Hontoria), 2 Q.F., 1 M.	1	11·5	80	93
cr.	Conde de Venadito	I.	1130	210 0	32 0	12 6	1	1600	Carthagena	1888	..	..	..	4 4·7-in. (Hontoria), 2 2·7-in., 2 Q.F., 5 M.	2	14·0	220	130
to.g.b.	Don Alvaro de Bazan	S.	830	235 0	..	..	2	4600	Ferrol	Bldg	..	..	..	2 4·7-in. (Hontoria) Q.F., 4 1·5-in., 2 M.	4	20 0	..	110
cr.	Don Antonio de Ulloa	I.	1130	210 0	32 0	12 6	1	1600	Cadiz	1887	..	..	..	4 4·7-in. (Hontoria), 2 2 7-in., 2 Q.F., 5 M.	2	14·0	210	130
"	Don Juan de Austria	I.	1130	210 0	32 0	12 6	1	1600	Carthagena	1887	..	..	..	4 4·7-in. (Hontoria), 3 2·2-in. Q.F., 2 1·5-in., 5 M.	3	14·0	210	130
to. g. b.	Doña Maria de Molina	S.	830	235 0	..	..	2	4600	Ferrol	1896	..	..	..	2 4·7-in. (Hontoria), Q.F., 4 1·5-in., 2 M.	4	20 0	..	110
to.g.b.	Destructor	S.	458	192 6	25 0	7 0	2	3800	Clydebank	1887	..	..	..	1 3·5-in., 4 6-pr. Q.F., 4 M.	3	22·56	104	55

SPAIN.—Cruising Ships—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Maximum Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	ins.	ins.			knots.	tons.	
g.v.	Elcano	I.	524	157	5	25	7	8	6	2	600	Carraca	1885	..	..	..	3 4·7-in. (Hontoria), 2 Q.F., 2 M.	1	11·5	80	116
d.v.	Fernando el Catolico (Torpedo training)	I.	500	157	5	25	7	8	5	2	550	La Seyne	1875	..	..	..	1 6·2-in.M.L.R. (Palliser), 2 4·7-in., smooth-bores, 1 M.	..	10·0	20	98
to.g.b.	Filipinas	S.	750	213	0	27	0	8	6	2	4600	Cadiz	1892	..	..	..	2 4·7-in. Q.F., 4 1·5-in., 4 M.	4 sub.	20·0	120	110
,,	Galicia	S.	571	190	0	23	0	10	4	2	2600	Le Graña	1891	..	..	..	2 4·7-in. (Hontoria), 4 2·2-in. Q.F., 1 M.	2	19·0	106	80
g. v.	General Lezo	I.	524	157	5	25	7	8	6	2	600	Cathagena	1885	..	..	..	2 4·7-in. (Hontoria), 1 3·5-in., 2 Q.F., 1 M.	2	11·0	80	97
cr.	Infanta Isabel	I.	1130	210	11	32	2	12	5	1	1500	Cadiz	1885	..	..	..	4 4·7-in. (Hontoria), 2 2·7-in., 3 Q.F., 4 M.	2	14·0	220	130
,,	Isabel II.	I.	1130	210	11	32	2	12	5	1	1500	Ferrol	1886	..	..	..	4 4·7-in. (Hontoria), 2 7·7-in., 4 Q.F., 3 M.	2	14·0	220	130
,,	Isla de Cuba	S.	1030	185	0	30	0	11	6	2	2200	Elswick	1887	..	..	2½	4 4·7-in. (Hontoria), 4 6-pr. Q.F., 2 3-pr, 2 M.	3	16·0	160	160
sl.	Isla de Luzon	S.	1030	185	0	30	0	11	6	2	2200	Elswick	1887	..	..	2½	4 4·7-in. (Hontoria), 46-pr. Q.F., 2 3-pr., 2 M.	3	16·0	160	160
,,	Jorge Juan	W.	935	203	5	29	6	12	2	1	1100	La Seyne	1876	..	..	..	3 4·7-in. (Hontoria), 2 2·8-in. (Krupp), 2 M.	..	13·0	130	146
cr.	Lepanto	S.	4826	318	6	50	6	20	0	2	12,000	Carthagena	1892	..	..	4¾	4 7·8-in. (Hontoria), 6 4·7-in. Q.F., 6 6-pr., 4 3-pr. 5 M.	5	20·0	1100	276
g.v.	Magellanes	I.	524	157	5	25	7	8	6	2	600	Cadiz	1885	..	..	..	3 4·7-in. (Hontoria), 3 M.	1	11·0	80	97
to.g.b.	Marques de la Victoria	S.	830	235	0	..		..		2	4600	Ferrol	Bldg.	..	..	..	2 4·7-in. (Hontoria) Q.F., 4 1·5-in., 2 M.	4	20·0	..	110
cr.	Marques de la Ensenada	S.	1030	185	0	30	0	11	6	2	1600	Carraca	1890	..	..	2½	4 4·7-in. (Hontoria), 5 Q.F., 4 M.	4	15·0	160	164
d.v.	Marques del Duero	I.	500	157	5	25	7	8	5	2	550	La Seyne	1875	..	..	..	1 6·2-in. M.L.R. (Palliser), 2 4·7-in. smooth-bores, 1 M.	..	10·0	90	98
to.g.b.	Marques de Molins	S.	571	190	0	23	0	10	4	2	2600	La Graña	1891	..	..	..	2 4·7in. (Hontoria), 4 2·2-in. Q.F., 1 M. (Marques de Molins and Martin Alonzo Pinzon)	2	19·0	106	80
,,	Martin Alonzo Pinzon	S.	571	190	0	23	0	10	4	2	2600	La Graña	1892	..	..	..					
cr.	Navarra	W.	3342	232	11	42	7	20	4	1	4400	Ferrol	1881	..	..	..	4 5·9-in., 2 4·7-in., 2 3·4-in., 4 2·9-in., 4 M.	2	14·0	470	300
,,	Nueva Espana	S.	630	190	0	23	0	11	9	2	2600	Carraca	1889	..	..	..	2 4·7-in. (Hontoria), 4 2·2-in. Q.F.,	2	18·0	106	91
,,	Quiros	S.	315	155	0	23	0	11	0	..	500	Hong Kong	1895	..	..	..	2 2·2-in. Q.F., 2 M.	..	11·5	..	..
to.g.b.	Rapido	S.	570	190	0	23	0	10	4	2	2600	Carraca	1891	..	..	..	1 M. 2 4·7-in. (Hontoria), 4 2·2-in. Q.F., 1 M.	2	18·0	106	80
cr.	Reina Christina	S.	3520	282	2	42	7	16	5	1	3970	Ferrol	1886	..	..	..	6 6·2-in. (Hontoria), 2 2·7-in., 3 2·2-in. Q.F., 2 1·5-in., 6 3-pr., 2 M.	5	17·5	600	370
,,	Reina Mercedes	S.	3090	278	10	42	7	16	5	1	3700	Carthagena	1887	..	..	..	6 6·2-in. (Hontoria), 2 2·7-in., 3 2·2-in. Q.F., 2 1·5.in., 6 1·4-in., 2 M.	5	17·5	600	375
to.g.b.	Temerario	S.	570	190	0	23	0	10	4	2	2600	..	1889	..	..	..	2 4·7-in. (Hontoria), 4 2·2-in. Q.F., 1 M.	2	20·5	106	82
cr.	Velasco	I.	1152	209	11	29	3	12	5	1	1500	Blackwall	1881	..	..	..	3 5·9-in. 4-ton (Armstrong), 2 2·7-in. (Hontoria), 2 M.	..	14·3	220	173
to.g.b.	Veloz	S.	750	213	0	27	0	8	6	2	4500	..	Bldg.	..	..	..	2 5·9-in. (Hontoria), 4 2·2-in. Q.F., 4 M.	2	20·0	106	..
,,	Vincente Yanez Pinzon	S.	571	190	0	23	0	10	4	2	2600	La Graña	1891	..	..	..	2 4·7-in. (Hontoria), 4 2·2-in. Q.F., 1 M.	2	19·0	106	80
,,	Villalobos	S.	315	155	0	23	0	11	0	..	500	Hong Kong	1896	..	..	..	2 2·2-in. Q.F., 2 M.	..	11·5	..	..

Seven 1st class Gunboats, Hernan Cortez, Pizzaro, Vasco Nuñez de Balboa, Ponce de Leon, Velasquez, Alvarado, and Sandoval (300 tons), built for Cuba, 1895. Quiros, 347 tons, launched 1895, and Villalobos (1896) for the Philippines. Twenty-three 2nd class Gunboats, 103 to 255 tons. Forty-one 3rd class Gunboats, of which eighteen built for Cuba, 1895.

The following vessels are contemplated: two cruisers of 6800 tons, one of 5300 tons, besides torpedo craft.

SWEDEN.—Armoured Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Maximum Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour.			Armament.		Speed.	Normal Coal Supply.	Complement.
															Belt.	Gun Position.	Backing. Deck Plating.	Guns.	Torpedo Tubes.			
			tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	inches.	inches.	inches.			knots.	tons.	
a.g.b.	Berserk	I.	452	131	3	29	6	8	3	2	155	Norköping	1874	..	2½	14	¾	1 9·4-in., 2 M.	..	8·0	19	45
"	Björn	I.	457	131	3	26	3	8	3	2	155	Norköping	1874	..	2½	14	¾	1 9·4-in., 2 M.	..	8·0	19	45
"	Fenris	I.	259	104	11	22	4	7	10	1	44	Stockholm	1872	..	2	11	¾	1 9·4-in., 2 M.	..	6·0	7	30
"	Folke	I.	460	131	3	26	3	8	3	2	155	Norköping	1875	..	2½	14	¾	1 9·4-in., 2 M.	..	8·0	19	45
"	Gerda	I.	457	131	3	26	3	8	3	2	133	Stockholm	1873	..	2½	14	¾	1 9·4-in., 2 M.	..	8·0	19	45
c.d.s., t.	Göta	S.	3135	258	6	48	0	16	0	2	4677	Gothenburg	1890	..	11½	11½–9¾	2	2 10-in., 4 6-in., 5 Q.F., 6 M.	3	15·96	200	150
a.g.b.	Hildur	I.	457	131	3	26	3	8	3	2	133	Stockholm	1872	..	2½	14	¾	1 9·4-in., 2 M.	..	8·0	19	45
c.d.s., t.	John Ericsson	I.	1500	200	2	45	11	11	6	1	380	Norköping	1865	..	4½	11½	1	2 9·4-in., 2 M.	..	6·0	112	80
"	Loke	I.	1600	205	3	45	11	11	10	1	430	Norköping	1871	..	4½	18	1	2 9·4-in., 2 M.	..	7·0	112	75
"	Njord	S.	3300	270	4	47	10	16	6	2	3700	Gothenburg	Bldg.	..	9·5	..	..	2 9·8-in., 6 4·7-in. Q.F., 10 2·2-in., 4 M.	1	16·0	300	200
"	Odin	S.	3300	270	4	47	10	16	6	2	3700	..	1896	..	9·5	..	.. 2	2 9·8-in., 6 4·7-in. Q.F., 10 2·2-in., 4 M.	1	16·0	300	200
a.g.b.	Sköld	I.	247	104	11	22	4	8	3	1	17	Stockholm	1869	..	1	9	¾	1 9·4-in., 2 M.	..	4·0	5	39
"	Sölve	I.	454	131	3	29	6	8	3	2	155	Norköping	1875	..	2½	14	¾	1 9 4-in., 2 M.	..	8·0	19	45
c.d.s., t.	Svea	S.	2900	249	4	49	3	15	9	2	3100	Gothenburg	1886	127,300	11½	11½	2	2 10-in. (Armstrong), 4 6-in., 4 l., 6 M.	3	15·45	200	268
"	Thor	S.	3300	270	4	47	10	16	6	2	3700	Stockholm	Bldg.	..	9·5	..	..	2 9·8-in., 6 4 7-in. Q.F., 10 2·2-in., 4 M.	1	16·0	300	200
t.	Thordön	I.	1500	200	2	45	11	11	6	1	380	Norköping	1866	..	4½	11½	1	2 9·4-in., 2 M.	..	6·0	112	80
c.d.s., t	Thule	S.	3150	249	4	49	3	15	9	2	4750	Stockholm	1892	..	11½–7¾	11½	2	2 10-in. (Armstrong), 4 6-in., 5 l., 6 M.	3	16·0	..	165
"	Tirfing	I.	1500	200	2	45	11	11	6	1	380	Norköping	1867	..	4½	11½	1	2 9·4-in., 2 M.	..	6·0	112	80
a.g.b.	Ulf	I.	457	131	3	26	3	8	3	2	155	Norköping	1873	18,000	2½	14	¾	1 4·7-in. Q.F., 2 2·2-in.	..	8·0	20	45

SWEDEN.—Cruising Ships, &c.

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Maximum Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour.		Armament.		Speed.	Normal Coal Supply.	Complement.
															Gun Position.	Deck.	Guns.	Torpedo Tubes.			
			tons.	ft.	in.	ft.	in.	ft.	in.	no.					in.				knots.	tons.	
corv.	Balder . .	W.	1886	203	5	36	0	18	4	1	1380	Carlskrona .	1870	..	..	..	2 6-in. (Armstrong), 6 4·7-in., 2 l., 4 M.	..	12·0	200	218
g.v.	Blenda . . .	I.	500	167	4	25	11	9	2	2	590	Gothenburg .	1875	..	..	..	1 10·6-in., 1 4·7-in., 2 M. .	..	12·0	98	71
„	Disa	I.	500	167	4	25	11	9	2	2	590	Carlskrona .	1877	..	..	..	1 6-in., 1 4·7-in., 2 l., 2 M. .	..	12·0	98	72
tor. ship.	Drott (ex Ran) . .	I.	630	173	10	26	3	9	6	2	960	Stockholm .	1877	..	..	..	4 Engström, Q.F. . . .	3	13·0	100	..
g.v.	Edda	I.	640	180	5	27	3	9	6	2	960	Carlskrona .	1882	..	..	..	1 10·6-in., 1 6-in., 2 l., 2 M. .	..	13·0	80	76
corv.	Freja	S.& W.	2000	216	6	39	4	18	9	1	1750	Malmö . .	1885	..	..	..	5 6-in., 8 5-in., 4 l., 4 l. . .	..	12·0	180	250
to.g.b.	Eidern . .												1896								
„	Järnan . .	S.	670	223	0	27	6	8	9	1	4000	..	1897	..	..	..	2 4·7-in. Q.F., 4 2·2-in. . .	1	19·0	..	..
„	Örn . . .												1897								
g.v.	Rota	I.	537	170	7	26	3	9	2	2	780	Stockholm .	1878	..	..	..	1 10·6-in., 1 4·7-in., 2 M. .	..	13·0	80	72
corv.	Saga	W.	1535	200	2	32	10	17	1	1	900	Carlskrona .	1878	..	..	..	1 6-in. (Armstrong), 6 4·7-in., 4 M., 2 l.	..	11·0	170	189
g.v.	Skäggald . . .	I.	537	170	7	26	3	9	2	2	780	Stockholm .	1879	..	..	..	1 6-in., 1 5-in., 2 M. . .	..	13·0	80	72
„	Skagul . . .	I.	537	170	7	26	3	9	2	2	780	Stockholm .	1878	..	..	..	1 6-in., 1 5-in., 2 M. . .	..	13·0	80	72
„	Skuld	I.	537	170	7	26	3	9	2	2	780	Carlskrona .	1880	..	..	..	1 6-in., 1 5-in., 2 M. . .	..	13·0	80	72
„	Urd	I.	537	170	7	26	3	9	2	2	780	Malmö . .	1877	..	..	..	1 6-in., 1 5-in., 2 Q.F., 2 M. .	..	13·0	80	71
„	Verdande . . .	I.	537	170	7	26	3	9	2	2	780	Carlskrona .	1879	..	..	..	1 6-in., 1 5-in., 2 M. . .	..	13·0	80	72

Four gunboats of 190 to 200 tons, and about 130 I.H.P. each, and carrying 1 5-in B.L.R. and 2 M.; also one gunboat of 280 tons and 440 H.P., armed with 4 quick-firing guns.

TURKEY.—Armoured Ships.

A number of ships have been struck out of these lists owing to information obtained from Constantinople. Of the remainder few have any fighting value.

Class.	NAME.	Material.	Displacement.	Length.		Beam.		Maximum Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour.			Armament.		Speed.	Normal Coal Supply	Complement.
															Belt.	Gun Position	Deck.	Guns.	Torpedo Tubes.			
			tons.	ft.	in.	ft.	in.	ft.	in.	no.					inches.	inches.	inches.			knots.	tons.	
c.b.	Avni-Illah .	I.	2400	226	4	36	0	16	5	1	2200	Thames .	1869	..	6	6	1½	4 9-in. M.L.R. (Armstrong), 4 M., 4 l. .	1	12·0	220	225
b.	Azizieh (a) .	I.	6400	292	0	55	9	25	7	1	3735	Clyde .	1864	..	5½	4½	..	2 9·4-in. (Krupp), 8 8·2-in., 6 3·9-in., 7 M., 2 l.	2	13·0	750	600
c.b.	Feth-i-Bulend .	I.	2806	236	3	39	4	18	1	1	3250	Thames .	1869	..	9	9	5	4 9-in. M.L.R. (Armstrong), 4 M., 4 l. .	1	13·0	300	250
a.g.b.	Feth-el-Islam .	I.	335	101	9	24	7	5	11	1	290	Gironde .	1864	..	3	3	..	2 7-in. (Armstrong), 2 l. . . .	..	8·0	20	..
c.b.	Hamidieh .	I.	6700	292	0	55	9	24	10	1	4500	Turkey .	1885	..	9	5	3	10 10·2-in. (Krupp), 2 6·6-in., 6 l., 2 M.	2	13·0	600	..
b.	Mahmudieh .	I.	6400	292	0	55	9	25	7	1	3735	Thames .	1864	..	5½	4½	..	2 9·4-in. (Krupp), 8 8·2-in., 6 3·9-in., 7 M., 2 l.	2	12·0	750	600
c.b.	Mesoodieh .	I.	9120	331	5	59	0	25	11	1	7431	Thames .	1874	..	12	9	1	12 10-in. M.L.R. (Armstrong), 3 5·9-in. (Krupp), 7 M., 6 l.	..	13·0	600	..
,,	Muin-i-Zaffer .	I.	2400	230	0	36	0	16	5	2	2200	Thames .	1869	..	6	6	1½	4 10-in. M.L.R. (Armstrong), 1 4·7-in. (Krupp), 4 M., 4 l.	1	12·0	220	..
,,	Mukadim-i-Hair .	I.	2806	236	3	39	4	18	1	1	3000	Turkey .	1872	..	9	9	5	4 10-in. M.L.R. (Armstrong), 1 4·7-in. (Krupp), 4 M., 4 l.	1	12·0	300	250
,,	Nedjim-i-Schefhet	I.	2050	203	5	42	7	16	5	2	1900	La Seyne .	1868	..	6	5	..	1 9-in., 4 7-in. (Armstrong), 4 M., 4 l.	1	11·0	300	220
b.	Orkanieh .	I.	6400	292	0	55	9	25	7	1	3735	Clyde .	1865	..	5½	4½	..	2 9·4-in. (Krupp), 8 8·2-in., 6 3·9-in., 7 M., 2 l.	2	12·0	750	600
,,	Osmanieh (a) .	I.	6400	292	0	55	9	25	7	1	3735	Clyde .	1864	..	5½	4½	..	2 9·4-in. (Krupp), 8 8·2-in., 6 3·9-in. 7 M., 2 l.	2	12·0	750	600

(a) These ships are cut down forward and aft, and a barbette fitted at each end.

TURKEY.—Cruising Ships, &c.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Cost.	Date of Launch.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.				£		in.	in.			knots.	tons.	
cr.	Fezibahri	S.	1815	226 0	35 0	14 0	2	2500	Turkey	..	Bldg.	..	½	6 6-in. (Krupp)	7	17·0	..	..
"	Heibetnuma	S. &W.	1960	226 0	37 0	14 0	1	2500 ind.	Turkey	..	1890	..	..	3 6·6-in. (Krupp), 6 4·7-in., 6 Q.F.	2	14·0	..	..
"	Hundavendikiar	S.	4050	279 0	49 3	21 0	2	..	Turkey	..	Bldg.	..	2	2 8·9-in. (Krupp), 6 5·9-in., 4 3·9-in.	5	..	..	300
g.v.	Lutfi-hamayoun	C.	1313	210 0	35 0	14 0	1	2800	Turkey	..	1892	..	..	4 6-in. (Krupp), 6 4·7-in. 6 Q.F.	2	13·0	..	..
to. g.b.	Namet	S.	900	230 0	31 0	16 6	2	4500	Gaarden	..	1890	¼	..	2 4-in. (Krupp), 16 M.	2	19·0	..	111
"	Pelenk-i-deria	S.	840	236 3	31 0	16 6	2	5000	Gaarden	..	1890	¼	..	2 4-in. (Krupp), 16 M.	2	20·0	..	111
g.v.	Sedul Bahr	W.	800	173 6	26 7	11 6	1	160	Turkey	..	1894	..	2	4 4·7-in. (Krupp), 6 M.	2	12·7	120	..
cr.	Selimieh	S.	4050	279 0	49 3	21 0	2	..	Turkey	..	Bldg.	..	½	2 8·2-in. (Krupp), 6 5·9-in., 4-in., 6 M.	..	..	..	300
"	Shadie	S.	1815	226 0	35 0	14 0	2	2500	Turkey	..	Bldg.	..	..	6 5·9-in. (Krupp)	7	17·0	..	..
to. g.b.	Shahani-deria	S.	450	200 0	23 0	9 0	2	3000	Turkey	..	1892	..	..	2 4 7-in. Q.F. (Krupp), 6 M.	4	22·0	..	..
"	New vessel (Y)	S.	900	230 0	31 0	16 6	2	4500	Gaarden	..	Bldg.	¼	..	2 4-in. (Krupp), 6 M.	2	19·0	..	..
g.v.	Zuhaf	W.	800	173 6	26 7	11 6	1	160	Turkey	..	1894	..	..	4 4·7-in. (Krupp), 6 M.	2	12·7	120	..

UNITED STATES.—Armoured Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Maximum Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position	Armour. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal *Coal Supply.	Complement.
			tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	inches.	inches.	inches.			knots.	tons.	
c.d.s., t. (1 t.)	Ajax	I.	2100	226	4	43	7	13	9	1	340	Pittsburg	1864	125,000	5	11	..	2 15-in. smooth-bores, 2 l.	..	6·0	160	..
t.	Alabama	S.	11,525	368	0	72	3	25	0	2	10,000	Philadelphia	Bldg.	530,000	9½–16½	17	2¾	4 13-in., 14 6-in. Q.F., 17 6-pr., 4 1-pr., 4 M.	4	16·0	800/1200	520
c.d.s., t. (2 t.)	Amphitrite	I.	3990	259	4	55	9	14	3	2	1426	Wilmington	1883	..	9–7½	11½	2	4 10-in., 2 4-in. Q.F., 2 6-pr., 2 3-pr., 2 M.	..	10·5	250	170
a. c.	Brooklyn	S.	9250	400	6	64	0	26	0	2	18,769	Philadelphia	1895	700,000	3–7½	8–5	6–3	8 8-in., 12 5-in. Q.F., 12 6-pr., 4 1-pr., 4 M.	6	21·9	900/1753	500
c.d.s., t. (1 t.)	Camanche	I.	1875	200	2	45	11	11	6	1	350	New York	1863	125,000	5	10	..	2 15-in. 19-ton smooth-bores	..	6·0	160	..
c.d.s., t. (1 t.)	Canonicus	I.	2100	226	4	43	7	13	9	1	320	Boston	1864	125,000	5	10	..	2 15-in. 19-ton smooth-bores	..	6·0	160	..
c.d.s., t. (1 t.)	Catskill	I.	1875	200	2	45	11	11	6	1	350	New York	1863	..	5	10	..	2 15-in. 19-ton smooth-bores	..	6·0	150	..
t.	Illinois	S.	11,525	368	0	72	3	25	0	2	10,000	Newport News	Bldg.	518,000	9½–16½	17	2¾	4 13-in., 14 6 in. Q.F., 17 6-pr., 4 1-pr., 4 M.	4	16·0	800/1200	520
b.	Indiana	S.	10,288	348	0	69	3	27	1	2	9738	Philadelphia	1893	604,000	18 H. S.	6–17	3	4 13-in., 8 8-in., 4 6-in., 20 6-pr. Q.F., 6 1-pr., 4 M.	7	15·5	400/1640	473
b.	Iowa	S.	11,410	360	0	72	0	27	0	2	11,000	,,	1896	900,000	14	15	3–2½	4 12-in., 8 8-in., 6 4-in. Q.F., 20 6-pr., 6 1-pr., 4 M.	6	16·1	625/1780	486
c.d.s., t. (1 t.)	Jason	I.	1875	200	2	45	11	11	6	1	350	New York	1864	..	5	11	..	2 15-in. 19-ton smooth-bores	..	6·0	150	..
ram	Katahdin (ex Ammen)	S.	2150	250	0	43	6	16	5	2	5068	Bath, Me.	1893	186,000	6	18	6–3	4 6-pr. Q.F.	..	16·1	175/192	..
super-posed turrets	Kearsarge, Kentucky	S.	11,525	368	3	72	2	25	1	2	10,500	Newport News.	Bldg.	800,000 each	15 N. S.	6–17 N. S.	3–5 N. S.	4 13-in., 4 8-in., 14 5-in. Q.F., 20 6-pr., 6 1-pr., 4 M., 1 l.	5	16·0	410/1210	520
c.d.s., t. (1 t.)	Lehigh	I.	1875	200	2	45	11	11	6	1	350	Chester	1864	..	5	11	..	2 15-in. 19-ton smooth-bores	..	6·0	150	..
c.d.s., t. (1 t.)	Mahopac	I.	2100	226	4	43	7	13	9	1	320	Jersey	1865	..	5	10	..	2 15-in. 19-ton smooth-bores	..	6·0	160	..
	Maine	S.	6682	318	0	57	0	22	6	2	9293	New York	1890	517,600	12	10–12	4–2	4 10-in., 6 6-in., 8 6-pr. Q.F., 8 1-pr., 4 M.	7	17·4	400/896	874
c. d. s., t. (1 t.)	Manhattan	I.	2100	226	4	43	7	13	9	1	320	Jersey	1865	..	5	..	..	2 15-in. 19-ton smooth-bores	..	6·0	160	..
b.	Massachusetts	S.	10,288	348	0	69	3	27	1	2	10,403	Philadelphia	1893	604,000	18 H. S.	6–17	3	4 13-in., 8 8-in., 4 6-in., 20 6-pr. Q.F., 6 1-pr., 4 M	7	16·2	400/1640	473
c.d.s., t. (2 t.)	Miantonomoh	I.	3990	259	4	55	9	15	3	2	1426	Chester	1876 reblt.	272,000	7	11½	2	4 10-in., 2 6-pr. Q.F., 2 3-pr., 2 1-pr.	..	10·5	250	155
c.d.s., t. (2 t.)	Monadnock	I.	3990	259	4	55	9	14	7	2	3000	S. Francisco	1883 reblt.	272,000	9	11½	2	4 10-in., 2 4-in. Q.F., 2 6-pr., 2 3-pr., 2 1-pr., 2 M.	..	12·0	250	171
c.d.s., t. (1 t.)	Montauk	I.	1875	200	2	45	11	11	6	1	350	Brooklyn	1864	..	5	11	..	2 15-in. 19-ton smooth-bores	..	5·5	160	..
c.d.s., b.	Monterey	S.	4080	256	0	59	0	15	4	2	5244	S. Francisco	1891	..	13	10 14	3-2	2 12-in., 2 10-in., 6 6-pr. Q.F., 4 1-pr., 2 M.	..	13·6	200	191
c.d.s., t. (1 t.)	Nahant	I.	1875	200	2	45	11	11	6	1	350	Boston	1863	..	5	11	..	2 15-in. 19-ton smooth-bores	..	6·0	160	..
c.d.s., t. (1 t.)	Nantucket	I.	1875	200	2	45	11	11	6	1	350	Boston	1863	..	5	11	..	2 15-in. 19-ton smooth-bores	..	5·6	160	..
a.c.	New York	S.	8200	380	6	64	10	26	6	2	17,401	Philadelphia	1891	597,000	4	7–10	6–3	6 8-in., 12 4-in. Q.F., 8 6-pr. 4 1-pr. 4 M.	6	21·0	750/1290	484
b.	Oregon	S.	10,288	348	0	69	3	27	1	2	11,110	S. Francisco	1893	636,000	18 H.S.	6–17	3	4 13-in., 8 8-in., 4 6-in., 20 6-pr. Q.F., 6 1-pr., 4 M.	7	16·7	400/1640	473
c.d.s., t. (1 t.)	Passaic	I.	1875	200	2	45	11	11	6	1	350	Brooklyn	1863	..	5	11	..	2 15-in. 19-ton smooth-bores	..	6·0	160	..
c.d.s., t. (2 t.)	Puritan	I.	6060	289	0	60	1½	18	1	2	3700	Chester	1884 reblt.	..	12	11½	2	4 12-in., 6 4-in. Q.F., 4 3-pr. 4 1-pr., 4 M.	..	12·4	400	220
c.d.s., t. (2 t.)	Terror	I.	3990	259	4	55	9	14	7	2	1600	Philadelphia	1883 reblt.	206,800	7	11½	1½	4 10-in., 2 6-pr. Q.F., 2 3-pr., 2 1-pr., 2 M.	..	10·0	250	171
c.	Texas	S.	6315	301	4	64	1	24	0	2	8000	Norfolk	1892	495,000	12	12	3	2 12-in., 6 6-in. 12 6-pr. Q.F., 6 1-pr., 4 M.	6	17·0	500/850	392
t.	Wisconsin	S.	11,525	368	0	72	3	25	0	2	10,000	S. Francisco	Bldg.	535,000	9½–16½	17	2¾	4 13-in., 14 6-in. Q.F., 17 6-pr., 4 1-pr., 4 M.	4	16·0	800/1200	520
c.d.s., t. (1 t.)	Wyandotte	I.	2100	225	0	43	7	13	6	1	320	Cincinnati	1864	..	5	10	..	2 15-in. 19-ton smooth-bores	..	6·0	160	..

* The figures below the line in this column are bunker capacity.

UNITED STATES.—Cruising Ships, &c.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.					£	in.	in.			knots.	tons.	
g.b.	Annapolis	S. sh.	1000	168 0	36 0	12 7	1	850	Elizabeth Pt.	1896	..	..	..	6 4-in. Q.F., 4 6-pr., 2 1-pr., 1 3-pr. H.I.M.	..	12·0	100	144
cr.	Atlanta (b)	S.	3189	270 0	42 0	18 0	1	3511	Chester	1884	123,600	..	1½	2 8-in., 6 6-in., 2 6-pr. Q.F., 2 3-pr., 2 1-pr., 6 M.	..	16·33	490	270
"	Baltimore	S.	4600	315 0	48 6	20 6	2	10750	Philadelphia	1888	210,000	4½	4-2½	4 8-in., 6 6-in., 4 6-pr. Q.F., 2 3-pr., 2 1-pr., 6 M.	5	20·6	400	375
..	Bancroft	S.	838	180 0	32 0	11 6	2	1213	Elizabeth, N.J.	1892	..	..	..	4 4-in. Q.F., 2 6-pr., 2 3-pr., 1 1-pr., 2 M.	2	14·37	200	..
cr.	Bennington	S.	1750	230 0	36 0	14 0	2	3533	Chester	1890	98,000	..	..	6 6-in., 2 6-pr. Q.F., 2 3-pr., 1 1-pr., 4 M.	2	17·5	200/400	197
"	Boston	S.	3189	270 0	42 0	18 0	1	3780	Chester	1884	123,200	..	1½	2 8-in., 6 6-in., 2 6-pr. Q.F., 2 3-pr., 2 1-pr., 2 1·8-in., 2 1·4-in., 2 M.	..	15·0	490	270
g.v.	Castine (a)	S.	1220	198 0	32 0	12 2	2	1600	Bath, Me.	1892	..	..	..	8 4-in. Q.F., 4 6-pr., 2 1-pr., 2 M.	.	16·2	125	154
cr.	Charleston	S.	4040	300 0	46 2	19 6	2	7500	S. Francisco	1888	..	2	¾	2 8-in., 6 6-in., 4 6-pr. Q.F., 2 3-pr., 2 1-pr., 6 M.	4	18·7	328	300
"	Chicago *	S.	4500	315 0	48 2	19 0	2	9000	Chester	1885	177,800	4	1½	4 8-in., 8 6-in., 2 5-in., 10 6-pr. Q.F., 4 1-pr., 2 M.	..	18·0	831	325
"	Cincinnati	S.	3183	291 3	42 0	18 0	2	10,000	Brooklyn	1892	220,000	..	2½	1 6-in., 10 5-in. Q.F., 8 6-pr., 4 1-pr., 2 M.	6	19·0	250	295
"	Columbia	S.	7475	412 0	58 2	22 6½	3	21,500	Philadelphia	1892	545,000	4	4-2½	1 8-in., 2 6-in., 8 4-in. Q.F., 12 6-pr., 4 1-pr., 4 M.	6	22·8 (t)	750/1670	477
cr.	Concord	S.	1700	230 0	36 0	14 0	2	3513	Chester	1890	98,000	..	..	6 6-in., 2 6-pr. Q.F., 2 3-pr., 1 1-pr. 4 M.	2	17·0	200	193
"	Detroit	S.	2000	257 0	37 0	14 6	2	5400	Baltimore	1892	..	..	3	9 5-in. Q.F., 6 6-pr., 2 1-pr., 2 M.	6	18·71	200	187
cr.	Dolphin	S.	1485	239 6	31 10	14 2	1	2300	Chester	1884	61,000	..	..	2 4-in. Q.F., 2 6-pr., 4 M.	..	15·5	310	..
"	Helena	S.	1392	250 0	40 0	10 0	2	1600	Newport News	1896	..	3	2½	8 4-in. Q.F., 6 6-pr., 2 1-pr., 2 M.	..	13·0	100	170
g.v.	Machias (a)	S.	1220	198 0	32 0	12 2	2	1600	Bath, Me.	1892	..	..	..	8 4-in. Q.F., 4 6-pr., 2 1-pr., 2 M.	..	15·46	125	154
cr.	Marblehead	S.	2000	257 0	37 0	14 6	2	5400	Boston	1892	122,500	..	3	9 5-in. Q.F., 6 6-pr., 2 1-pr., 2 M.	6	18·94	200	187
g.b.	Marietta	S. sh.	1200	174 0	34 0	13 5	2	850	S. Francisco	1896	..	..	..	6 4-in. Q.F., 4 6-pr., 2 1-pr., 1 3-pr. H.I.M.	..	12·0	100	144
cr.	Minneapolis	S.	7475	412 0	58 2	22 6½	3	21,500	Philadelphia	1893	421,000	4	4-2½	1 8-in., 2 6-in. Q.F., 8 4-in., 12 6-pr., 4 1-pr., 4 M.	5	23·0 (t)	750/1670	477
"	Montgomery	S.	2000	257 0	37 0	14 6	2	5400	Baltimore	1892	..	..	3	9 5-in. Q.F., 6 6-pr., 2 1-pr., 2 M.	6	18·87	200	187
"	Nashville	S.	1371	200 0	36 0	12 0	2	1790	Newport News	1895	..	3	2½	8 4-in. Q.F., 4 6-pr., 2 1-pr., 2 M.	1	14·0	150	169
"	Newark	S.	4083	310 0	49 0	18 9	2	8869	Philadelphia	1890	250,000	..	..	12 6-in., 4 6-pr. Q.F., 4 3-pr., 2 1-pr., 7 M.	..	19·0	850	300
g.b.	Newport	S. sh.	1000	168 0	36 0	12 7	1	850	Bath, Me.	1896	92,000	..	..	6 4 in. Q.F., 4 6-pr. 2 1-pr., 1 3-pr. H I.M.	..	12·0	100	144
cr.	Olympia	S.	5800	340 0	53 0	21 6	2	17,363	S. Francisco	1892	477,600	4	4⅔-2	4 8-in., 10 5-in. Q.F., 14 6-pr., 6 1-pr., 4 M.	6	21·69	400/1169	412
"	Petrel	S.	890	176 3	31 0	11 7	2	1513	Baltimore	1888	50,000	1	1	4 6-in., 2 3-pr. Q.F., 1 1-pr, 4 M.	..	13·7	100	132
"	Philadelphia	S.	4413	315 0	48 6	19 3	1	10,500	Philadelphia	1889	265,000	..	4-2½	12 6-in., 4 6-pr. Q.F., 4 3-pr., 2 1-pr., 7 M.	5	19·68 (t)	400/1085	385
g.b.	Princeton	S. sh.	1000	168 0	36 0	12 7	1	850	Camden	Bldg.	..	..	..	6 4-in. Q.F., 4 6-pr., 2 1-pr, 1 3-pr. H.I.M.	..	12·0	100	141
cr.	Raleigh	S.	3183	291 3	42 0	18 0	2	10,000	Norfolk	1892	28,600	..	2½	1 6-in., 10 5-in. Q.F., 8 6-pr., 4 1-pr., 2 M.	1	19·0	350	312
"	San Francisco	S.	4083	310 0	49 2	18 9	2	10,400	S. Francisco	1889	270,000	4½	3-2	12 6-in., 4 6-pr. Q.F., 4 3-pr., 2 1-pr., 7 M	6	20·2	350	3:3
"	Vesuvius (Dynamite Gun Cruiser)	S.	930	246 0	26 6	10 7½	2	4459	Philadelphia	1888	70,000	..	..	3 dynamite guns, 15 in. cal., 3 3-pr. Q.F.	..	21·6	150	..
g.b.	Vicksburg	S. sh.	1000	168 0	36 0	12 7	1	850	Bath, Me.	1896	92,000	..	..	6 4-in. Q.F., 4 6-pr., 2 1-pr., 1 3-pr. H.I.M.	..	12·0	100	144
cr.	Wheeling	S. sh.	1200	174 0	34 0	13 5	2	850	S. Francisco	Bldg	..	..	..	6 4-in. Q.F., 4 6-pr., 2 1-pr., 1 3-pr. H.I.M.	..	12·0	100	144
"	Wilmington	S. sh.	1392	250 0	40 0	10 0	2	1600	Newport News	1895	..	3	2½	8 4-in. Q.F., 6 6-pr., 2 1-pr., 2 M.	..	13·0	100	170
"	York Town	S.	1703	230 0	36 0	14 0	2	3660	Philadelphia	1888	98,000	..	..	6 6-in., 2 6-pr. Q.F., 2 3-pr., 1 1-pr., 4 M.	2	17·2	200	192

* Has received 4 cylindrical boilers and 6 Babcock and Wilcox water-tube boilers. (a) Has been lengthened 14 feet amidships to increase her stability. (b) To have new machinery, modern battery and different rig.

Three paddle steamers.—Michigan (685 tons and 300 horse-power), and the Monocacy (1370 tons and 850 horse-power), and the Thetis of 1250 tons, building.
Ten screw steamers, of from 300 tons to 560 tons, and about 300 to 500 H.P.

SHIPS BELONGING TO POWERS WHOSE NAVIES ARE OF LITTLE OR NO IMPORTANCE.

Belgium.—Twelve steam vessels, between 419 and 684 tons net, launched between 1870 and 1888, principally employed as packets, which are under the orders of the Government.

Bulgaria.—Eleven steamers of small size, of which one is used as the Prince's Yacht. Two armoured gunboats, for the defence of the Danube, building at Leghorn. Other ships are to be laid down.

Egypt.—This Power has now no efficient warships.

Hayti.—Steel gun vessel—Crête à Pierrot—1000 tons, 1 6·2-in., 1 4·7-in., and 4 3·9-in. Q.F., 6 M. Steel gunboat—Capois la Mort—260 tons, 1 3·9-in., and 4 1-pr. Q.F. Iron corvette—Dessalines—1200 tons, armed with 1 3·9-in. Q.F., 2 3·9-in. B.L., 2 l., 2 M. Three iron or steel sloops:—St. Michael, 1804, and Toussaint L'Ouverture, of from 500 to 900 tons, all of 12 to 14 knots speed, and armed with one large and four to eight small guns. Gun vessel, 22nd of December, of 900 tons, 9 knots speed, armed with four 40-pdr. Armstrongs.

Liberia.—The Gorronommah gunboat of 150 tons displacement; completed 1892, and another one, the Rocktown, completed at Rotterdam in 1896 (12 knots on trial).

Mexico.—The *Zaragoza*, built of steel, 1200 tons, 1300 horse-power, 15 knots speed, and armed with four 4·7-in. guns and 4 rapid-firing guns. Two gun vessels of 450 tons, and 11 knots speed, armed with two 6½-inch muzzle loaders and two small guns. Two small gunboats of 10 knots speed. A gunboat is in hand at New Orleans.

Morocco.—A torpedo cruiser, of 1200 tons displacement, 2500 HP., 18 knots speed, and carrying two guns, 4·7-in. B.L., and 4 Q.F. guns, built in 1892.

Persia.—Despatch vessel—the Persepolis—of 1200 tons and 10 knots speed. She is armed with 5 small breech-loading guns.

Peru.—Lima, built in 1881, of 1700 tons displacement, 1800 horse-power, and 16 knots speed; armed with two 6-in. B.L.R. guns. Screw steamer Santa Rosa, of about 400 tons.

Roumania.—Elizabeta, protected cruiser (deck 3 in. thick), built in 1887 at Elswick; 230 ft. long, 32 ft. 10 in. beam, 1320 tons, 4500 I.H.P.; 4 5·9-in. B.L.R., 4 Q.F., 2 M., 4 torpedo tubes. Composite gunboat Mircea, 350 tons; Grivitza, 180 tons. Six gunboats of 45 to 110 tons, seven to 9 knots speed. Six coast-guard vessels—Oltul, Siretul, Bistritza, Olteano, Smeo, and Monteano—95 tons, 100 ft. long, 13·6-in. beam, 6 ft. draught; natural draught 11 knots, forced draught 13½ knots; 1 Q.F., 2 M. Screw steamer—Romania—240 tons, repaired 1890. Six first-class torpedo-boats (120 ft. 6-in., 21 knots); 2 second class (63 ft. 16·5 knots), built 1882–1888.

Saint Domingo.—The Independencia, built in England 1894, 170 ft. long, 25 ft. broad, displacement 322 tons, and armed with seven Hotchkiss quick-firing guns. Restauracion, steel gun-vessel, 1000 tons, launched at Glasgow in 1896. The 14-knot cruiser Presidente has been reconstructed, and carries seven guns.

Sarawak.—Two gunboats, of 175 and 118 tons respectively, of low speed, each armed with two guns.

Siam.—Two corvettes (800 tons, 8 guns); six gunboats. One deck-protected cruiser, the Maha Chakrkri, 290 ft. long, 39 ft. 4 in. broad, of 2500 tons displacement and 17 to 18 knots speed; armament, four 4·7-in. quick-firing guns, and ten 6-pdr. quick-firing guns. Cruiser Makut-Rajakamar, 500 tons.

Uruguay.—Gunboats: General Artigas, 274 tons, 12½ knots speed, 2 4·7-in. (Krupp), 2 M.; General Rivera, 300 tons, 12 knots speed, armed with 1 5·9-in. and 1 2·3-in. gun; and the General Jaurez.

Venezuela.—Gun-vessel, Libertador, 832 tons. Four river gunboats building.

BRITISH AND FOREIGN TORPEDO-BOAT FLOTILLAS.

The Tables below are substantially those which appeared in last year's *Naval Annual*. By the kind assistance of many torpedo-boat builders, British and foreign, they have been brought up to date.

The following is the usual synopsis of the torpedo-boats, other than submarine-boats, described in the tables:—

Power.	Destroyers.	Sea-going. 126 ft. to 150 ft.	1st Class. 115 ft. to 125 ft.	2nd Class. 101 ft. to 114 ft.	3rd Class. 86 ft. to 100 ft.	Vedettes. 85 ft. and under.
Great Britain ..	92	43	26	4	20	73
British Possessions	..	8	..	1	..	11
Argentine Republic	4	8	..	..	4	14
Austria-Hungary ..	..	31	..	5	26	7
Brazil	8	10	..	..	10	8
Chili	4	6	1	..	8	4
China	4	6	1	25	2	13
Costa Rica	..	..	..	..	..	1
Denmark	4	6	1	3	2	14
France	14	36	69	78	36	9
Germany	6	95	4	9	..	16
Greece	..	6	..	..	11	34
Italy	16	96	..	4	36	32
Japan	5	2	1	21	19	..
Mexico	..	5	..	..	..	..
Netherlands	13	6	9	3	6	23
Norway	..	3	..	7	3	4
Portugal	..	..	15	5	1	24
Roumania	1	3	..	..	..	2
Russia	15	73	6	1	..	109
Spain	6	14	4	2	..	7
Sweden	..	1	..	10	7	7
Turkey	3	9	7	..	7	..
United States ..	9	13	..	5	1	4

Great Britain and Dependencies.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Mean Speed on Trial, or expected.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
Great Britain.			Feet	Feet.	Feet.		Tons.		Knots.				Tons.
TORPEDO-BOAT DESTROYERS													
Ardent	Chiswick ..	1894	200	19	7	2	265	4,800	27·97	1-12 pr. 5-6 prs.	2	45	60
Banshee	Birkenhead ..	1894	210	19·5	..	2	290	4,400	27·97	1-12 pr. 5-6 prs.	2	50	
Boxer	Chiswick ..	1894	200	19	7·8	2	250	4,200	29·17	1-12 pr. 5-6 prs.	2	45	60
Bruizer	Chiswick ..	1895	200	19	7·8	2	265	4,500	29·97	1-12 pr. 5-6 prs.	2	45	60
Charger	Poplar	1894	190	18·5	5·25	2	250	3,100	27·98	1-12 pr. 5-6 prs.	2	45	60
Conflict	East Cowes ..	1894	205·6	20	..	2	270	4,370	27·21	1-12 pr. 5-6 prs.	2	50	
Contest	Birkenhead ..	1894	210	19·5	..	2	290	4,400	27·4	1-12 pr. 5-6 prs.	2	50	
Daring	Chiswick ..	1893	185	19	6·3	2	260	4,842	27·90	2-12 prs. 3-6 prs.	3		50
Dasher	Poplar	1895	190	18·5	5·25	2	250	3,182	26·21	1-12 pr. 5-6 prs.	2	45	60
Decoy	Chiswick ..	1894	185	19	7	2	260	4,200	27·77	1-12 pr. 3-6 prs.	3		50
Dragon	Birkenhead ..	1894	210	19·5	..	2	290	4,500	27·14	1-12 pr. 5-6 prs.	2	50	
Ferret	Birkenhead ..	1893	194	19·25	5	2	280	4,810	27·62	1-12 pr. 3-6 prs.	3	50	70
Fervent	Paisley	1895	200	19	7·8	2	270	3,800	[27]	1-12 pr. 5-6 prs.	2	50	70
Handy	Govan	1895	200	19	7·8	2	260	3,800	27·04	1-12 pr. 5-6 prs.	2	50	70
Hardy	Sunderland ..	1895	196	19	5	2	245	4,200	26·8	1-12 pr. 5-6 prs.	2	50	70
Hart..	Govan	1895	185	19	7	2	260	4,010	27·07	1-12 pr. 5-6 prs.	2	50	70
Hasty	Poplar	1894	190	18·5	5·25	2	250	3,250	26·03	1-12 pr. 5-6 prs.	2	45	60
Haughty..	Sunderland ..	1895	196	19	5	2	265	4,000	27·1	1-12 pr. 5-6 prs.	2	50	60
Havock	Poplar	1893	180	18·5	5·25	2	240	3,500	26·77	1-12 pr. 3-6 prs.	3	43	57
Hornet	Poplar	1893	180	18·5	5·25	2	240	4,000	27·31	1-12 pr. 3-6 prs.	3	43	57
Hunter	Govan	1895	..	..	..	2	260	4,000	27·2	1-12 pr. 5-6 prs.	2		
Janus	Jarrow	1895	200	19·7	6·5	2	277	3,950	27·8	1-12 pr. 5-6 prs.	2	50	60
Lightning	Jarrow	1895	200	19·7	6·5	2	280	3,900	27·94	1-12 pr. 5-6 prs.	2	50	60
Lynx	Birkenhead ..	1894	194	19·25	5	2	280	4,000	27·00	1-12 pr. 3-6 prs.	3	50	70
Opossum	Hebburn ..	1895	200	19	5·2	2	290	4,052	28·24	1-12 pr. 5-6 prs.	2	50	60
Porcupine	Jarrow	1895	200	19·7	6·5	2	280	3,650	27·91	1-12 pr. 5-6 prs.	2	50	60
Ranger	Hebburn ..	1895	200	19	5·2	2	264	3,900	27·13	1-12 pr. 5-6 prs.	2	50	60
Rocket	Clydebank ..	1894	205·6	19·5	5·25	2	280	4,200	27·37	1-12 pr. 5-6 prs.	2	50	60
Salmon	Hull	1895	200	19·5	5·4	2	264	3,580	27·60	1-12 pr. 5-6 prs.	2	50	60
Shark	Clydebank ..	1894	205·6	19·5	5·25	2	280	4,250	27·59	1-12 pr. 5-6 prs.	2	50	60
Skate	Barrow	1895	195	20·5	..	2	265	4,100	27·10	1-12 pr. 5-6 prs.	2	50	60
Snapper	Hull	1895	200	19·5	5·5	2	270	4,500	27·9	1-12 pr. 5-6 prs.	2	50	60
Spitfire	Elswick ..	1895	200	19	5·3	2	300	3,780	27·5	1-12 pr. 5-6 prs.	2	45	60
Starfish	Barrow	1894	195	20·5	..	2	265	4,000	27·97	1-12 pr. 5-6 prs.	2	45	60
Sturgeon	Barrow	1894	195	20·5	..	2	265	4,010	27·16	1-12 pr. 5-6 prs.	2	45	60
Sunfish	Hebburn ..	1895	200	19	5·2	2	290	4,292	27·62	1-12 pr. 5-6 prs.	2	50	60
Surly	Clydebank ..	1894	205·6	19·5	5·25	2	280	4,400	28·05	1-12 pr. 5-6 prs.	2	50	50
Swordfish	Elswick ..	1895	200	19	5·3	2	300	4,100	[27]	1-12 pr. 5-6 prs.	2	45	60
Teazer	East Cowes ..	1895	200	19·5	5·6	2	270	4,500	[27]	1-12 pr. 5-8 prs.	2	50	60
Wizard	East Cowes ..	1895	200	19·5	5·2	2	270	4,400	[27]	1-12 pr. 5-6 prs.	2	45	60
Zebra	Blackwall ..	1895	200	20	6	2	300	3,850	27·00	1-12 pr. 5-6 prs.	2	50	60
Zephyr	Paisley	1895	200	19	5·3	2	270	3,850	[27]	1-12 pr. 5-6 prs.	2	50	60
Albatross	Chiswick ..	bldg.	227·6	22·0	9	2	300	7,700	32	1-12 pr. 5-6 prs.	2	60	80
Angler	Chiswick ..	1896	210·6	21·6	8·3	2	300	5,400	30	1-12 pr. 5-6 prs.	2	60	80
Arab	Clydebank ..	bldg.	227·6	22·0	9	2	300	7,700	32	1-12 pr. 5-6 prs.	2	60	80
Ariel	Chiswick ..	bldg.	210·6	21·6	5·8	2	300	5,430	30	1-12 pr. 5-6 prs	2	60	80
Avon	Barrow	bldg.	210·6	21·6	5·8	2	300	5,510	30	1-12 pr. 5-6 prs	2	60	80
Bat	Jarrow	bldg.	210·6	21·6	5·8	2	300	5,900	30	1-12 pr. 5-6 prs.	2	60	80
Bittern	Barrow	bldg.	210·6	21·6	5·8	2	300	5,850	30	1-12 pr. 5-6 prs.	2	60	80
Brazen	Clydebank ..	1896	210·6	21·6	5·8	2	300	5,850	30	1-12 pr. 5-6 prs.	2	60	80
Bullfinch..	Hull	bldg.	227·6	22·0	9	2	300	7,700	32	1-12 pr. 5-6 prs.	2	60	80
Chamois	Jarrow	bldg.	210·6	21·6	5·3	2	300	5,900	30	1-12 pr. 5-6 prs.	2	60	80
Cheerful	Hebburn ..	bldg.	227·6	22·0	9	2	300	7,700	32	1-12 pr. 5-6 prs.	2	60	80
Coquette	Chiswick ..	bldg.	227·6	22·0	9	2	300	7,700	32	1-12 pr. 5-6 prs.	2	60	80
Crane	Jarrow	bldg.	210·6	21·6	5·3	2	300	5,900	30	1-12 pr. 5-6 prs.	2	60	80
Cygnet	Chiswick ..	bldg.	227·6	22·0	9	2	300	7,700	32	1-12 pr. 5-6 prs.	2	60	80
Cynthia	Chiswick ..	bldg.	227·6	22·0	9	2	300	7,700	32	1-12 pr. 5-6 prs.	2	60	80
Desperate	Chiswick ..	1895	210·6	21·6	5·3	2	300	5,400	30·42	1-12 pr. 5-6 prs.	2	58	80
Dove	Hull	bldg.	227·6	22·0	9	2	300	7,700	32	1-12 pr. 5-6 prs.	2	60	80
Earnest	Birkenhead ..	1896	210·6	21·7	5·3	2	300	6,000	30	1-12 pr. 5-6 prs	2	58	80
Electra	Clydebank ..	bldg.	210·6	20	5·3	2	300	5,800	30	1-12 pr. 5-6 prs.	2	58	80
Express	Birkenhead ..	bldg.	227·6	22·0	9	2	300	7,700	33	1-12 pr. 5-6 prs.	2	60	80
Fairy	Govan	bldg.	227·6	22·0	9	2	300	7,700	32	1-12 pr. 5-6 prs.	2	60	80
Fame	Chiswick ..	1896	210·6	21·7	5·8	2	300	5,400	30·15	1-12 pr. 5-6 prs.	2	58	80
Fawn	Jarrow	bldg.	227·6	22·0	9	2	300	7,700	32	1-12 pr. 5-6 prs.	2	60	80
Flirt..	Jarrow	bldg.	227·6	22·0	9	2	300	7,700	32	1-12 pr. 5-6 prs.	2	60	80
Flyingfish	Jarrow	bldg.	210·6	20	5·3	2	300	6,000	30	1-12 pr. 5-6 prs.	2	58	80
Foam	Chiswick ..	1896	210·6	21·7	5·3	2	300	5,400	30	1-12 pr. 5-6 prs.	2	58	80
Gipsy	Govan	bldg.	227·6	22·0	9	2	300	7,700	32	1-12 pr. 5-6 prs.	2	60	80
Griffon	Birkenhead ..	1896	210	20	5·3	2	300	6,000	30	1-12 pr. 5-6 prs.	2	58	80
Kestrel	Clydebank ..	bldg.	227·6	22·0	9	2	300	7,700	32	1-12 pr. 5-6 prs.	2	60	80
Leopard	Barrow	bldg.	227·6	22·0	9	2	300	7,700	32	1-12 pr. 5-6 prs.	2	60	80
Locust	Birkenhead ..	bldg.	210	21·7	6·3	2	300	6,000	30	1-12 pr. 5-6 prs.	2	58	80
Mallard	Chiswick ..	1896	210·6	21·7	5·8	2	300	5,500	30	1-12 pr. 5-6 prs.	2	58	80
Mermaid	Hebburn ..	bldg.	227·6	22·0	9	2	300	7,700	32	1-12 pr. 5-6 prs.	2	60	80
Osprey	Govan	bldg.	227·6	22·0	9	2	300	7,700	32	1-12 pr. 5-6 prs.	2	60	80
Otter..	Barrow	bldg.	227·6	22·0	9	2	300	7,709	32	1-12 pr. 5-6 prs.	2	60	80
Panther	Birkenhead ..	bldg.	210·6	21·7	6·3	2	300	6,000	30	1-12 pr. 5-6 prs.	2	58	80
Quail	Birkenhead ..	1895	213·6	21·6	5·3	2	300	6,000	30·38	1-12 pr. 5-6 prs.	2	58	90

Great Britain and Dependencies—*continued.*

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Dimensions. Beam.	Dimensions. Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
TORPEDO-BOAT DESTROYERS			Feet.	Feet.	Feet.		Tons.		Knots.				Tons
Recruit	Clydebank ..	1896	210·6	21	5·3	2	300	5,900	30	1–12 pr. 5–6 prs.	2	58	80
Seal	Birkenhead ..	1896	210·6	21·7	5·3	2	300	6,000	30	1–12 pr. 5–6 prs.	2	58	80
Sparrowhawk	Birkenhead ..	1895	213·6	21·7	5·3	2	300	6,000	30·20	1–12 pr. 5–6 prs.	2	58	90
Star	Jarrow	1896	210·6	21	5·3	2	300	5,900	30.05	1–12 pr. 5–6 prs.	2	58	80
Sylvia	Sunderland ..	bldg.	227·6	22·0	9	2	300	7,700	32	1–12 pr. 5–6 prs.	2	60	80
Thrasher	Birkenhead ..	1895	213·6	21·7	5·3	2	300	6,000	30·00	1–12 pr. 5–6 prs.	2	58	90
Violet	Sunderland ..	bldg.	227·6	22·0	9	2	300	7,700	32	1–12 pr. 5–6 prs.	2	60	80
Virago	Birkenhead ..	1895	213·6	21·7	5·3	2	300	6,000	30·36	1–12 pr. 5–6 prs.	2	58	90
Vulture	Clydebank ..	bldg.	210·6	21	5·3	2	300	6,000	30	1–12 pr. 5–6 prs.	2	58	80
Whiting	Jarrow	1826	210·6	21	5·3	2	300	6,000	30	1–12 pr. 5–6 prs.	2	58	80
Wolf	Birkenhead ..	bldg.	210·6	21·7	5·3	2	300	6,000	30	1–12 pr. 5–6 prs.	2	58	80
2 Unnamed	Not yet laid down.												
FIRST CLASS—													
1 (*ex* Lightning)	Chiswick ..	1877	84·6	10·9	5	1	27	460	19	..	1	..	
2–9 (8 boats)	Chiswick ..	1878–9	87	10·9	4	1	28	450	20	..	1	15	
10	Chiswick ..	1880	90·5	10·9	4	1	28	450	21·7	..	1	25	
11, 12 (2 boats)	Chiswick ..	1880	87	10·9	4	1	28	450	20	..	1	15	7
13	Lambeth ..	1878	87	10·9	4	1	28	460	21	..	2	15	7
14	Poplar	1878	87	11	4·5	1	33	550	22	..	2	15	7
15	..	..	87	10·9	4	1	28	450	21	..	2	15	7
17, 18 (2 boats)	Poplar	1877	86	11	4·5	1	33	450	21	..	2	15	7
19	East Cowes ..	1878	87	10·9	4	1	28	460	21	..	2	15	7
20	..	1880	87	10	4	..	28	360	16·9	..	2	15	
21, 22 (2 boats)	Chiswick ..	1885	113	12·5	5·7	1	63	730	20	..	3	..	10
23, 24 (2 boats)	Poplar	1885–6	113	12·5	5·5	1	67	600	19·5	2–3 prs.	3		
25–29 (5 boats)	Chiswick ..	1886	127·5	12·5	6·2	1	60	600	21	..	4	15	
30–33 (4 boats)	Poplar	1886	125	13	5·5	1	60–66	670	19·5	2–3 prs.	5	15	20
34–38 (5 boats)	East Cowes ..	1886	125	14·6	4	1	60–66	950	18–19	..	5	15	
39, 40 (2 boats)	Poplar	1885	100	12·5	..	..	40	500	..	..	1	15	
41–60 (20 boats)	Chiswick ..	1886	127·5	12·5	6·2	1	60	700	21	2–3 prs.	4	15	
61, 63–74, 76–78 (16 boats)	Poplar	1886	125	13	5·5	1	75	700	19–20	2–3 prs.	5	15	20
79	Poplar	1886	125	13	5·5	..	75	1,000	22·4	2–3 prs.	..	15	20
80	Poplar	1887	135	14	6	1	105	1,540	23	4–3 prs.	5	21	30
81 (*ex* Swift)	East Cowes ..	1885	150	17·5	..	1	125	..	..	6–3 prs.	3	25	35
82–87 (6 boats)	Poplar	1889	130	13·5	5·5	1	85	1,100	23	3–3 prs.	3	19	20
88, 89 (2 boats)	Poplar	1894	142	14·75	4	1	112	1,600	..	3–3 prs.	3	18	20
90	Poplar	1895	140	14·25	3·75	1	100	1,430	..	3–3 prs.	3	18	18
91, 92 (2 boats)	Chiswick ..	1894	140	15·5	7·5	1	130	2,400	23–24	3–3 prs.	3	18	25
93	Chiswick ..	1893	140	15·5	5·4	2	130	2,200	23·5	3–3 prs.	3	18	25
94–96 (3 boats)	East Cowes ..	1894	140	15·5	..	1	130	2,000	23·2	3-3 prs.	3	18	25
97	Birkenhead ..	1893	140	15·5	..	1	130	2,690	23.35	3–3 prs.	3	18	25
SECOND CLASS—													
38–48 (10 boats)	Poplar	1889	60	9·2	3·7	1	16·5	230	16·5	1 mach.	1	9	11
49, 50 (2 boats)	Poplar	1887	60	8·5	3	1	15	200	17	1 mach.	1	9	
51–62 (12 boats)	Chiswick ..	1878–9	60·5	7·5	3·5	1	..	..	16·5	..	2	7	
63	..	1879	60	..	..	1	..	..	15	..	2		
64–73 (10 boats)	Chiswick ..	1880–1	60·5	7·5	3·5	1	..	..	16–17	..	2	7	
74, 75, 96, 97 (4 boats)..	Poplar	1883	62	7·6	3·6	1	12	..	16	1 mach	2	7	
76-95 (20 boats)	Chiswick ..	1882–3	63	7·5	3·5	1	..	..	16·5–17	..	2	7	
98	Chiswick ..	1883	66·3	7·5	2·5	hyd.	..	120	12·6	..	2	7	
99, 100 (2 boats)	Chiswick ..	1886	64	8	3·6	1	..	..	16–16·8	..	2	7	
101	..	..	64	..	..	..	..	..	..	..	2	7	
1 9 (9 boats)	East Cowes ..	..	56	..	..	1	12	..	14·5	2 mach.	sp	..	·7
Victoria.													
Childers	Chiswick ..	1883	113	12·5	5·9	1	65	730	20	2–1 prs.	..	12	10
One boat	Poplar	1891	130	13·5	5·7	1	82	1,150	23	3–3 prs.	3	19	20
Nepean, Lonsdale (2 boats)	Chiswick ..	1884	63	7·5	3·2	1	12	150	17·5	..	1	7	
New South Wales.													
Acheron, Avernus (2 boats)	..	1879	..	..	..	1	16	300	16				
Queensland.													
Mosquito	Chiswick ..	1884	63	7·5	3·2	1	12	..	17	..	1	7	
Wasp	..	..	..	..	..	..	12	..	..	..	..	7	
Tasmania.													
One boat	Chiswick ..	1884	63	7·5	3·2	1	12	..	17	..	1	7	
New Zealand.													
Nos. 1–4 (4 boats)	Chiswick ..	1884	63	7·5	3	1	12	170	17	1 mach.	Sp.		
India.													
Nos. 1–3 (3 boats)	Chiswick ..	1888	134·5	14·8	7·1	1	96	1,270	23·2	2 Q.F.	5		
Nos. 4–6 (3 boats)	East Cowes ..	1889	130	14·6	..	..	95	1,030	20				
No. 7	Paisley	1888	130·4	14	..	..	92	1,060	21				

Argentine Republic.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Dimensions. Beam.	Dimensions. Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Santa Fé	Poplar.. ..	1896	190	19·6	7·4	2	280	4,000	26·5 *t.*	*1 14-pr., 3 6-pr. Q.F., 2 M.	3	54	80
Corrientes	Poplar.. ..	1896	190	19·6	7·4	2	280	4,000	27·4 *t.*		3	54	80
Missiones..	Poplar.. ..	1896	190	19·6	7·4	2	280	4,000	26·0 *t.*		3	54	80
Entre Rios	Poplar.. ..	1896	190	19·6	7·4	2	280	4,000	26·7 *t.*		3	54	80
FIRST CLASS—													
2 boats	Chiswick ..	1890–1	150	14·5	5·2	2	110	1,500	24·52	3 3-prs.	3	27	22
6 boats	Poplar.. ..	1890	130	13·5	6	1	85	1,200	23–24	2 3-pr. Q.F.	2	15	15
4 boats	Poplar.. ..	1880–2	100	12·5	6	1	52	600	20	2 mach.	3	14	10
SECOND CLASS—													
Nos. 1–8 (8 boats)..	Poplar.. ..	1890	60	9.2	3	1	16	230	17	1 Q.F.	1	10	1.25
Nos. 9–10 (2 boats)	Chiswick ..	1881	60	7·5	3·5	1	16	230	17	..	1		
VEDETTE BOATS—													
Nos. 1–4 (4 boats)..	..	1875	55	7	..	..	..	..	..	.	sp.		

The two 150-ft. boats are named Comodoro Py and Murature.

The six 130-ft. boats are named Bathurst, Buchardo, Jorge, King, Pinedo, and Thorne. They have locomotive boilers.

The four 100-ft. boats are named Alerta, Centella, Ferre, and Py.

* ½-in. plating over entire engine and boiler space.

Austria-Hungary.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Dimensions. Beam.	Dimensions. Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
FIRST CLASS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
2 boats	Poplar.. ..	1885	135	13·7	5·6	1	95	1,250	22·4	2 Nord.	2	16	28
22 boats	Elbing, Trieste, &c.	1886-9	128	15·9	6·9	1	83	900 / 1,000	17·5 to 21·5	2 mach.	2	15	28
5 boats	Poplar.. ..	Bldg.	147	14·6	..	..	120	..	25	..	2		
Viper	Poplar.. ..	1895	147 6	14 9	7·6	1	130	2,001	26·5	2 3-pr. Q.F.	2	26	30
Natter	Elbing ..	1896	150	17·5	8·8	..	152	1,850	26·5	2 3-prs.	3	..	30
SECOND CLASS—													
Nos. 9–34 (26 boats)	Pola, Elbing, Chiswick, and Poplar.	..	87	8·5	3·5	1	..	..	18	1 mach.	2		
		..	86	11	4	1	33	450	19·5				
		.	87	10·8	5	1	..	..	18				
		1881	100	12	4·5	1	50	500	21				
Nos. 35–39 (5 boats)	Pola	..	..	..	..	1	63	..	20·5				
Nos. 2–8 (6 boats) *t.*	Pola and Poplar ..	..	..	..	..	1	27	250	15–18				
1 boat	E. Cowes ..	..	..	..	..	..	11	..	11				

Six sea-going boats proposed to be laid down in 1896.

Brazil.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Dimensions. Beam.	Dimensions. Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
FIRST CLASS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Nos. 1-5 (5 boats)	Poplar.. ..	1882	100	12·5	5·5	1	52	600	20	2 mach.	2	16	20
Araguary..	Chiswick ..	1891	150	14·5	5·2	2	150	1,550	25·1	2 Q.F.	4	27	22
Iguatemi	Chiswick ..	1891	150	14·5	5·2	2	150	1,550	25·4	2 Q.F.	4	27	22
Marcilio Diaz	Chiswick ..	1891	150	14·5	5·2	2	150	1,550	25·8	2 Q.F.	4	27	22
5 boats	Elbing ..	1892–3	152	17·2	7·9	2	130	2,200	28	2–1 prs.	3	24	30
Piratiny	..	..	130	12	..	..	..	..	10	2–1 pr.	1		
Poty	..	..	126	12	3	..	30	..	18	1–1 pr.	1		
SECOND CLASS—													
Inhanhuay (wood)..	New York..	1893	90	10	3	..	17	..	25	1–1 pr.	1	10	
4 boats	..	1883–4	..	..	..	1	17	..	17	..	..		
1 boat	Chiswick ..	1885	63	75	3·2	1	..	..	17			..	2
1 boat	Poplar.. ..	1886	60	8	3	1	14	200	17	..	1		
THIRD CLASS—													
Moxoto	Poplar.. ..	..	60	9·3	..	..	..	..	16	1–1 pr.	1		
5 boats	Chiswick ..	1883	45	6	1·2	1	3·5	..	12-13	1 mach.	sp.		

Eight destroyers of 26 knots, six torpedo-boats, and two submarine boats have been ordered.

Chili.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Dimensions. Beam.	Dimensions. Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Capitan Orella ..	Birkenhead.	1896	210	21·6	..	2	300	6000	30·17	1-12 pr. Q F. 5-6 pr.	2	65	90
Capitan Munoz Gamero.. ..	Birkenhead.	1896	210	21·6	..	2	300	6000	30·42	1–12 pr Q.F. 5–6 pr.	2	65	90
Teniente Serrano ..	Birkenhead.	1896	210	21·6	..	2	300	6000	30·35	1–12 pr. Q.F. 5 6 pr.	2	65	90
Guardia-Marina Riquelme	Birkenhead.	1896	210	21·6	..	2	300	6000	30·09	1-12 pr. Q.F. 5-6 pr.	2	65	90
FIRST CLASS—													
3 boats	Poplar.. ..	1881	86	12·5	..	1	25	400	19-20	..	4	15	
5 boats	Poplar.. ..	1881	100	12·5	..	1	35	400	18–19	4 mach.	4	15	9
Sergente Aldea ..	Poplar.. ..	1886	125	13·5	5·5	1	70	800	20	2 Q.F.	4	18	15
Injeniero Hyatt, Cirujano Videla and 4 others (Viper type)*	Poplar.. ..	1896	152·6	15·3	7·9	1	140	2200	27·5–27·2	3-3 pr. Q.F.	3	28	40
SECOND CLASS—													
Colocolo	Poplar ..	1880	45	8	..	..	5	40	16	2 mach.	2		
Tucapel	..	1880	50	9	..	..	5	40	16	2 mach.	2		
1 boat	East Cowes	1887	50	..	..	..	..	..	16				
1 boat	East Cowes	1892	60	9·6	5	1	15	270	19	..	1		

* The unnamed boats to be shipped in pieces and put together in Chili.

China.

Name or Number.	Where Built.	Launched.	Dimensions.			Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Length.	Beam.	Draught.								
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
DESTROYERS—													
4 unnamed	Elbing ..	Bldg.	193·6	..	..	2	..	6,500	32	..	..	..	..
FIRST CLASS—													
1 boat	Elbing ..	1886	144·3	16·4	7·5	1	128	1,400	24·2	4 1-pr. revs.	2	20	15
1 boat	Poplar.. ..	1887	128	13	5	1	69	1,000	23·9	{ 3 Q.F., 4 Gatlings }	3	28	15
25 boats	Stettin, &c..	1886–87	110	13	4·9	1	65	1,000	19·5	1 " . revs.	3	16	10
2 boats	Stettin ..	1883	86	10·4	3·4	1	28	650	18·2	1-pr. revs.	2	16	12
1 boat	Stettin ..	1884	123·5	21·7	..	..	..	..	19	..	5	16	
2 boats	Elbing ..	1895	128	15·8	..	..	120	1,250	2 45	Q.F.	2		
2 boats	..	Pro.	..	..	..	..	..	..	...	..	..	..	..
SECOND CLASS—													
11 boats	Elbing ..	1885–86	85	11·9	4·8	1	27	400	19	..	1	..	5
2 boats	China	..	52	6·7	3·3	1	..	..	16				

Particulars uncertain.

Costa Rica.

Costa Rica has one 62-ft., 15 knot boat.

Denmark.

Name or Number.	Where Built.	Launched.	Dimensions.			Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Length.	Beam.	Draught.								
FIRST CLASS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Delfinen	Chiswick ..	1883	111·5	12·6	6	1	59	620	20	1 mach.	2	14	9
Haien	Chiswick ..	1879	94	10·5	5	1	32	350	21·3	1 mach.	1	12	4
Havhesten	Chiswick ..	1888	137·9	14	7	1	94	1,200	22·8	2 1-pr. revs.	4	20	15
Hvalrossen	Chiswick ..	1884	114	12·6	6·5	1	64	660	18·7	1 mach.	2	14	10
Makrelen	Copenhagen	1893	140	14·2	7	2	112	1,200	..	..	..	..	16
Narhvalen	Chiswick ..	1888	137·9	14	7	1	94	1,200	22·3	2 1-pr. revs.	4	20	15
Nord Kaperen.. ..	Copenhagen	1893	140	14·2	7	2	112	1,200	..	2 1-pr. revs.	4	..	16
Sólóven	Chiswick ..	1887	131	14·8	6·8	1	89	1,200	23·3	2 mach.	4	20	14
Sóulven	Havre.. ..	1880	94·8	10·9	3·9	1	37	450	18·1	..	2	12	5
Springeren	Copenhagen	1891	119	13	4·9	1	81	800	18·3	2 1-pr. revs.	2	20	14
Stóren	Chiswick ..	1887	131	14·8	6·8	1	89	1,200	23	2 mach.	4	20	14
Sværdfisken	Chiswick ..	1881	110	12	6	1	49	600	20·7	1 mach.	2	14	9
1 boat	Copenhagen	Bldg.	85	13	..	..	44	360	14	2 mach.	1	..	..
SECOND CLASS—													
Nos. 4, 5 (2 boats) ..	Chiswick ..	1882	63	7·5	2·5	1	15	150	16·9	1 mach.	2	6	1
Nos. 6, 7 (2 boats) ..	Chiswick ..	1884	66·8	8	4·2	1	16	170	15·4	1 mach.	2	6	1·5
Nos. 8, 9 (2 boats) ..	Chiswick ..	1886	69·5	8·1	3·8	1	17	170	15·7	1 mach.	2	6	1
Nos. 10, 11 (2 boats).	Chiswick ..	1888	70·2	8	4	1	18	180	15·8	1 mach.	2	6	1
Nos. 12, 13 (2 boats).	Chiswick ..	1889	78·3	9	4·9	1	24	350	18	1 mach.	2	8	3
1 boat	Chiswick ..	1875	58	7·5	3	1	..	..	16	..	sp.		

Four destroyers and two boats are provided for.

France.

Name or Number.	Where Built.	Launched.	Dimensions.			Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Length.	Beam.	Draught.								
SEA-GOING—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Agile	La Seyne ..	1889	139	14·7	7·7	2	121	1,100	20·4	3–3 prs.	2	26	14
Alarme	St. Nazaire	1889	151	15·7	8·3	2	169	1,400	20·5	2–3 prs.	4	30	40
Aquilon	Normand ..	1895	137·8	14·6	7·9	2	127	2,000	26·17	2–3 prs.	2	34	17
Archer	Normand ..	1893	138	14·7	6·5	2	131	1,250	21	2–3 prs.	2	26	17
Argonaute..	St. Denis ..	1893	141	16·4	9·3	2	132	1,500	25·1	2–3 prs.	2	34	16
Ariel	Normand ..	1895	141	16·4	9·3	2	120	1,500	23·5	2–3 prs.	2	34	16
Aventurier	St. Nazaire..	1889	151	15·7	8·3	2	174	1,400	20·5	2–3 prs.	4	34	40
Averne	Havre ..	1894	141	16·4	9·3	2	133	1,500	24·4	2–3 prs.	2	27	16
Chevalier	Normand ..	1893	144·3	15·7	6·8	2	134	2,700	27·2	2–1 prs.	2	32	17
Corsaire	St. Denis ..	1893	160·5	15	5·4	2	171	2,500	25·5	4–1 prs.	2	32	15
Coureur	Chiswick ..	1888	147·5	14·5	4·6	2	129	1,550	23·28	4 Nords.	2	27	22
Cyclone (ex-Tenare) ..	Havre	Bldg.	144·2	15·2	10·0	2	152	3,200	30	2–1 prs.	2	..	..
Dauphin	Havre ..	1894	141	16·4	9·3	2	137	1,500	25·22	2–3 prs.	2	34	16
Défi	St. Nazaire..	1889	151	15·7	8·3	2	173	1,400	21	2–3 prs.	4	30	40
Dragon	Normand ..	1892	138	14·7	8·2	2	129	1,400	25	2–3 prs.	2	26	15·5
Eclair	La Seyne ..	1891	144·3	14·7	7·7	2	128	1,100	21·5	3–3 prs.	2	26	17
Flibustier	Normand ..	1894	143	16·4	9·3	2	132	1,500	23·5	2–3 prs.	2	34	16
Forban	Normand ..	1895	144·2	15·2	10	2	135	3,200	31·2	2–1 prs.	2	..	..
Grenadier	Normand ..	1892	138	14·7	8·2	2	129	1,400	25·25	2–3 prs.	2	26	15·5
Grondeur	Havre	1892	147·5	14·5	5	2	130	1,550	24	2–3 prs.	2	27	20
Kabyle	La Seyne ..	1891	144·3	14·7	7·7	2	128	1,100	21·6	3–3 prs.	2	27	17
Lancier	Normand ..	1893	138	14·7	8·2	2	128	1,400	25·79	2–3 prs.	2	26	15·5
Lansquenet*	Nantes ..	1893	165·4	15·8	4·2	2	150	2,800	..	2–3 prs.	..	..	..
Mangini	Nantes ..	1896	147·6	14·8	7·9	2	129	2,100	27·5	2–3 prs.	2	34	17
Mousquetaire	Havre ..	1892	154	15·7	7	2	150	2,100	24·77	2–1 prs.	2	32	18
Orage	La Seyne ..	1891	144·3	14·7	7·7	2	128	1,100	21·7	3–3 prs.	2	26	17
Ouragan	Nantes ..	1887	151	15·7	8·3	2	174	1,400	20	2–3 prs.	4	30	40
Sarrazin	Bourdeaux..	1893	139	14·7	7·7	2	131	1,100	20·5	3–3 prs.	2	26	14
Téméraire	St. Nazaire..	1889	151	15·7	8·3	2	174	1,400	21	2–3 prs.	4	30	40
Tourbillon	Bourdeaux..	1892	139	14·7	7·7	2	131	1,100	20·5	3–3 prs.	2	26	14
Tourmente	St. Denis ..	1893	141	16·4	9·3	..	132	1,500	24·6	2–3 prs.	2	25	15
Turco	St. Denis ..	1892	138	14·7	8·2	2	124	1,400	21·3	2–3 prs.	2	26	15·5
Véloce..	Havre	1892	147·5	14·5	5	2	130	1,550	23·6	2–3 prs.	2	27	20
Zouave	St. Denis ..	1892	138	14·7	8·2	2	124	1,400	21·3	2–3 prs.	2	26	15·5
FIRST CLASS—													
Balny	Normand ..	1886	134·5	11	7·2	1	66	700	20	2–1 pr. rev.	2	21	12
Bouët-Willaumez	St. Denis ..	1888	134·5	11	7·2	1	66	700	20	2–1 pr. rev.	2	21	12
Capt. Cuny	..	1886	134·5	11	7·2	1	66	700	20	2–1 pr. rev.	2	21	12
Capt. Mehl	..	1886	134·5	11	7·2	1	66	700	20	2–1 pr. rev.	2	21	12
Challier	..	1886	131·5	11	7·2	1	66	700	20	2–1 pr. rev.	2	21	12
Dehorter	St. Denis ..	1886	134·5	11	7·2	1	66	700	20	2–1 pr. rev.	2	21	12
Deroulède	Normand ..	1886	134·5	11	7·2	1	66	700	20	2–1 pr. rev.	2	21	12
Doudart de Lagrée	Normand ..	1886	134·5	11	7·2	1	66	700	20	2–1 pr. rev.	2	21	12
Edmond Fontaine	St. Denis ..	1888	134·5	11	7·2	1	66	700	20	2–1 pr. rev.	2	21	12
151 (*ex* G. Charmes) ..	La Seyne ..	1886	132·5	12·5	6·6	1	80	560	18·8	2–1 prs.	..	23	12
126–129 (4 boats).. ..	Normand ..	1888-9	118	13·2	8·7	2	79	1,250	21	2–1 prs.	2	21	10
145–149 (5 boats).. ..	Normand ..	1891–3	118	13·2	8·7	2	80	1,300	23·9	2–1 prs.	2	21	10
152–154 (3 boats).. ..	Normand ..	1892–	118	13·2	8·7	2	80	1,300	24·6	2–1 prs.	2	21	10
155–157 (3 boats).. ..	Bordeaux ..	1893	118	13·2	8·7	2	80	1,300	23	2–1 prs.	2	21	10
158–160 (3 boats).. ..	Cail	1893	118	13·2	8·7	2	80	1,300	23	2–1 prs.	2	21	10
161–163 (3 boats).. ..	St. Nazaire..	1892	118	13·2	8·7	2	80	1,300	23	2–1 prs.	2	21	10
164–166 (3 boats).. ..	La Seyne ..	1892	118	13·2	8·7	2	79	1,300	23	2–1 prs.	2	21	10
167–169 (3 boats).. ..	Creusot ..	1892	118	13·2	8·7	2	81	1,300	23	2–1 prs.	2	21	10
170, 171 (2 boats).. ..	Normand ..	1893–4	118	13·2	8·7	2	80	1,300	23–24	2–1 prs.	2	21	10
172, 173 (2 boats).. ..	Normand ..	1893–4	118	13·2	8·7	2	89	1,390	23–24	2–1 prs.	2	21	10
174–176 (3 boats).. ..	Normand ..	1893–5	118	13·2	8·7	2	94	1,390	23–24	2 1-prs.	2	21	10
177–179 (2 boats).. ..	Havre.. ..	1893	118	13·2	8·7	2	79	1,300	23–24	2–1 prs.	2	21	10
180–187 (8 boats).. ..	Creusot, etc.	1893–4	118	13·2	8·7	2	80	1,300	23	2–1 prs.	2	21	10
188–191 (4 boats).. ..	Normand, etc.	1893–4	118	13·2	..	..	79	..	24–25	..	2	21	10
192–194 (3 boats).. ..	Havre, etc.	1894–5	118	13·2	8·7	2	82	1,300	23·5	2–1 prs.	2	21	10
195–200 (6 boats).. ..	Havre, etc.	1894-5	319	13·2	8·7	2	80	1,300	23·5	2 1-prs.	2	21	10
201–205 (5 boats)	Havre	Bldg.	121·4	13·6	..	2	84	1,500	23·5	2–1 prs.	2	23	10
206–211 (6 boats).. ..	Bordeaux ..	Bldg.	121·4	13·6	..	2	86	1,500	23·5	2 1-prs.	2	23	10
212–218 (7 boats).. ..	Cherbourg etc.	Bldg.	121·6	13·6	..	2	86	1,500	23·5	2 1-prs.	2	23	10

* Failed to attain the contract speed (26 knots) and is receiving new boilers.
Sea-going boat Audacieux (139 ft., 103 tons), lost during the manœuvres, 1896.

France—*continued.*

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Dimensions. Beam.	Dimensions. Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
SECOND CLASS—													
26	..	1878	108	11	5·6	1	45	400	19	2-1 prs.	2	16	10
27	..	1878	104·4	10·6	6·1	1	44	400	19	2-1 prs.	2	16	10
28	..	1878	111·5	11	5·6	1	44	400	19	2-1 prs.	2	16	10
60-64 (5 boats)	..	1878-85	108·2	10·3	6·1	1	45	400	19	2-1 prs.	2	16	10
65, 66, 68 (3 boats) ..	..	1878-85	108·2	10·7	6·4	1	49	500	20	2-1 prs.	2	16	10
69-74 (6 boats)	..	1878-85	108·2	10·7	6·5	1	50	500	20	2-1 prs.	2	16	10
75-82, 84-109 (34 boats)	Cail, etc. ..	1885-92	114·7	10·6	6	1	54	525	20	2-1 prs.	2	16	10
111-125 (12 boats) ..	La Seyne, etc.	1885-90	114·7	10·6	6	1	54	525	20	2-1 prs.	2	16	10
130-144 (15 boats) ..	Normand, etc.	1889-90	111·5	11·4	6	1	52·8	520	21	2-1 prs.	2	16	10
THIRD CLASS—													
8, 10-16, 18, 19 (10 boats)	Various Firms in France and England.	1877-82	86	10·2	5	1	27	200-450	16-19	..	..	10	
20			87	10·8	5	1	33			..	..	10	
22, 23 (2 boats)			87·6	10·4	5·2	1	30			..	..	10	
24, 25 (2 boats)			88·5	10·4	6	1	30			..	..	10	
31, 32 (2 boats)			85·5	10·4	3·8	1	27			..	..	10	
33-36 (4 boats)			89	10·4	6	1	32			..	..	10	
37-40 (4 boats)			87	10·8	5	1	32			..	..	10	
41, 42 (2 boats)			87	10·8	6	1	33			..	..	10	
43, 44 (2 boats)			89	10·4	5·7	1	32			..	..	10	
47			87	10·8	5	1	33			..	..	10	
48			89	10·4	5·8	1	32			..	..	10	
49, 50, 53 (3 boats) ..			87	10·8	5	1	32			..	..	10	
54, 55 (2 boats)			91	10	6·1	1	32			..	..	10	
VEDETTE BOATS—													
(1 boat) (aluminium)..	Poplar ..	1894	62·3	9·1	..	1	14	210	20·5	..	1	8	
29, 30 (2 boats)	Chiswick ..	1876	67	8·5	3·5	1	16	..	18	..	1	8	
56, 57 (2 boats)	Chiswick ..	1879	59	7·5	3·5	1	12	50	16	..	1	8	
58, 59 (2 boats)	Chiswick ..	1881	63	7·5	3·5	1	11	50	17	..	1	8	
A B..	Creusot ..	1894	62·4	8·9	4·9	1	15	210	16·5	..	1	9	
SUBMARINE—													
Gustave Zédé	Toulon ..	1893	131	..	..	1	266	720	14	..	1	8	
Gymnote	Mourillon ..	1888	59	5·9	5·9	1	30	60	4-6	..	..	4	
Morse..	Cherbourg ..	Bldg.	168	..	..	..	146	..	13	..	1	9	

Second-class boat No. 83 lost off Cape de la Chèvre, 1897.

Germany.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
DIVISION BOATS—													
D 1, D 2 (2 boats)	Elbing ..	1887	180·6	21·6	9·8	2	250	1,800	19	6 1-pr. revs.	3	48	50
D 3, D 4 (2 boats)	Elbing ..	1888	184	21·8	9·6	2	300	2,000	20	{ 4 6-pr. Q.F. 2 1-pr. revs. }	3	48	90
D 5, D 6 (2 boats)	Elbing ..	1888–9	190·3	23	9·6	2	320	3,000	22½	{ 4 6-pr. Q.F. 2 1-pr. revs. }	3	48	90
D 7, D 8 (2 boats)	Elbing ..	1890	190·3	23	9·9	2	350	3,500	22½	6 Q.F.	3		
D 9, D 10 (2 boats)	Elbing ..	1894	197·0	24·3	9·9	2	380	4,500	26	6 Q.F.	3		
D 11	Chiswick ..	Bldg.	211·9	19·6	7·6	2	300	5,500	27½	5 3-pr. Q.F.	2		
1 boat	..	Pro.	..	..	..	..	350						
FIRST CLASS—													
S 1—S 65 (64 boats)*	Elbing ..	1883–92	{121 / 151}	15·7 / 15·6	6·7 / 6·7	..	85–88	{ 900 / 1,600 }	20–22½	2 1-pr. revs.	2	..	17
S 66—S 73 (10 boats)	Elbing ..	1893	154·3	16·4	..	2	{ 110 / 145 }	1,600	..	..	3		
S 74—S 81 (8 boats)	Elbing ..	1894	154·3	16·4	..	2	125	1,900	25	..	3		
S 82—S 87 (6 boats)	Elbing ..	Bldg.	152·6	..	..	2	140	2,300	26	2 1-pr. revs.	3	..	32
6 boats	..	Pro.	..	..	..	..	125						
V 1, V 2 (2 boats)	Stettin ..	1884	124·6	..	..	..	} 75	550 {	..	..	2		
V 3, V 4 (2 boats)	Stettin ..	1884	..	..	..	..	} 90	1,000 {	..	..	2		
V 5—V 10 (6 boats)	Stettin ..	1884	..	..	..	..			19	..	2		
G 1,	Gaarden ..	1885	124·6	15·7	6·6	..	88	1,000	19	2 1-pr. revs.	2	17	
Y 1,	Poplar ..	1884	120	12·5	5·5	1	65	650	19	2 1-pr. revs.	2	15	25
T 1, T 2 (2 boats)	Chiswick, &c.	1884	117·7	12·5	6·2	1	80	..	20·2	2 1-pr. revs.	2	15	22
H 1,	Kiel (Howaldt)	1886	..	..	..	..	80	1,000	20	2 1-pr. revs.	2		
K 1,	Kiel (Dockyard)	1887	118·1	13·4	5·9	..	85	1,000	22	2 1-pr. revs.	..	18	
SECOND CLASS—													
W 3—W 6 (4 boats)	Bremen ..	1884	103	12·8	..	..	..	650	18·5	2 1-pr. revs.	2	14	13
3 boats	..	1893	..	..	..	..	88	..	22				
2 boats	..	1893	..	..	..	..	90	..	3				
VEDETTE BOATS—													
13 boats	..	..	..	..	..	..	13·5	..	18				
2 boats	..	..	..	..	..	..	..	..	16				
1 boat	Chiswick ..	1884	63	8	4·3	1	..	..	15·5	1 mach.	2		

* S 41 lost 1895.

Greece.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
6 boats	Stettin ..	1885	128	15·3	5·4	1	85	1,050	19	4 1-pr. revs.	..	20	20
6 boats	Poplar.. ..	1881	100	12	4·2	1	48	600	19	2 1-pr. revs.	2	12	9
4 boats	La Seyne ..	1880	72	13	5·5	1	52	225	..	..	..	..	10
5 boats	La Seyne ..	1881	89	11	3·1	1	35	500	17·5	..	..	..	5
2 boats	Poplar.. ..	1878	75	10·8	2·5	..	18	295	16·2	..	..	..	1·5
8 boats	..	..	..	..	..	..	21	..	16				
20 boats	Various ..	..	..	..	..	..	..	..	..	..	sp.	..	..

Italy.

Name or Number.	Where Built.	Launched.	Dimensions.			Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Length.	Beam.	Draught.								
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
DESTROYER—													
Unnamed..	Sestri (Odero)	Bldg.	210	19·8	5 4	2	260	..	..	..	..	..	..
FIRST CLASS—													
5 boats {Aquila .., Sparviero, Nibbio .., Avvoltoio, Falco ..}	Elbing ..	1888	152	17·2	7·9	2	130	2,200	26·6	{2 3-pr. Q.F., 1 1-pr. Q.F., 1 1-pr. rev.}	3	24	40
Nos. 78, 79 (2 boats)	Venice ..	1887	135	14	5·3	2	110	1,600	24	{1 1-pr. Q.F., 1 1-pr. rev.}	5	20	30
1 boat	Sestri (Cdero)	Bldg.	157·4	19	14·8	..	147	..	..	..	..	..	..
SECOND CLASS—													
Nos. 76, 77 (2 boats)	Poplar.. ..	1887	140	14	5	2	100	1,600	25	{2 3-pr. Q.F., 1 1-pr. rev.}	5	20	30
Nos. 84–104, 106–111 (27 boats)	{Elbing and Italy ..}	1887–88	127·7	15·6	6·8	1	85	1,000	22·5	2 1-pr. Q.F.	2	17	7
Nos. 112-116, 118-135 (23 boats)	{Elbing and Italy ..}	1889–92	127·7	15·6	6·8	1	85	{1,100 1,200}	23	..	2	17	17
No. 117	..	1895	131·2	16·4	..	1	85	1,000	..	2 1 pr. Q.F.	2	17	17
Nos. 136–146 (11 boats)	Italy	1893–94	131·2	16·4	..	1	85	1,000	22	2 1-pr. Q.F.	2	17	17
Nos. 147–153 (7 boats)	Italy ..	1894-5	131·2	16·4	..	1	85	1,000	22	2 1-pr. Q.F.	2	17	17
12 boats	Italy	Bldg.	131·2	16·4	7	1	85	1,000	22	2 1-pr. Q.F.	2	17	17
Nos. 56–75 (20 boats)	{Elbing and Italy ..}	1885–87	127·7	15·6	6·8	1	65	1,000	22·5	2 1-pr. Q.F.	2	17	17
THIRD CLASS—													
No. 22	Poplar.. ..	1882	100	12·5	5·5	1	40	620	22	1 1-pr. rev.	2	11	10
No. 25	Poplar.. ..	1882	100	12·5	5·5	1	40	620	22	1 1-pr. rev.	2	11	10
Nos. 26–55 (30 boats)	{Chiswick and Italy ..}	1882–86	100	11·7	5·3	1	34	430	21·3	1 1-pr. rev.	2	11	7
Nos. 80–83 (4 boats)	Genoa.. ..	1888	101·6	..	..	1	34	430	21	1 1-pr. rev.	2	11	7
Nos. 23, 24 (2 boats)	Chiswick ..	1881	92	10·5	4·9	1	33	470	21·8	1 1-pr. rev.	2	11	7
No. 11	..	1883	..	..	..	1	31	250	..	..	..	10	
FOURTH CLASS.													
Veloce	Chiswick ..	1878	76	10	3·5	1	..	..	18	1 1-pr. rev.	..	10	
Nos. 1, 2 (2 boats)	Poplar.. ..	1879	86	11	4·5	1	25	420	21	..	..	10	7
Nos. 3–10, 16–18, 20, 21 (13 boats)	Chiswick ..	1883	63	7·5	2·5	1	13	170	16·5–17	1 1-pr. rev.	2	10	
Nos. 12–15 (4 boats)	Chiswick ..	1883	66	..	3·8	1	16	250	19·2	1 1-pr. rev.	2	10	
14 boats	E. Cowes ..	..	..	..	..		8–14	..	12–16	..	..	..	
SUBMARINE—													
Pullino	..	1893	..	..	..	..	..	..	8				
Audace	..	Bldg.	28·6	11·3	7·0	..	..	..	..	..	..	..	..
Delfino	Spezia.. ..	1895	49·0	..	..	..	..	..	10·0	..	..	..	..

Japan.

Name or Number.	Where Built.	Launched.	Dimensions.			Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Length.	Beam.	Draught.								
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
DESTROYERS—													
2 unnamed	Chiswick ..	Bldg.	210·0	19·6	7·6	2	275	5,500	30	6 Q.F.	2	..	..
2 unnamed*	Poplar.. ..	Bldg.	220·0	20·6	9·0	2	360	6,000	31	1 12-pr., 5 6-pr. Q.F.	2	56	90
Kotaka	Poplar.. ..	1886	170	19·6	5	2	190	1,400	19	4 mach.	6	..	50
14 boats†	Creusot ..	1889	114·7	10·6	6	1	56	525	20	2 1-prs.	..	16	
7 boats	Kobe	1889	114·7	10·6	6	1	56	525	20	2 1-prs.	..	16	
4 boats	Poplar.. ..	1879	100	12·5	..	1	40	620	20	..	..	..	3
1 boat	Normand ..	1891	118	13·2	8·7	2	75	1,300	23	2 1-prs.	2	21	10
2 boats	Elbing ..	1891	128	16	..	1	90	1,300	23	3 1-prs.	3		24
10 boats	Kobe	Bldg.	..	..	..	..	..	..	..	..	..	..	..
5 boats	Havre	Bldg.	..	..	..	..	..	..	..	..	..	..	..

* Conning tower armoured. † No. 16 lost off the Pescadores, 1895.

The ten years' programme includes 11 destroyers (4 ordered); 23 first-class (5 ordered), 31 second-class, and 35 third-class torpedo-boats, and a 67.0-ton torpedo transport.

Mexico.

Mexico has five first-class boats building or projected.

Netherlands.

Name or Number.	Where Built.	Launched.	Dimensions.			Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Length.	Beam.	Draught.								
FIRST CLASS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Ardjoeno	Poplar.. ..	1886	125	13	6	1	83	800	21	2 1 prs	2	16	10
Batok	Amsterdam	1887	125	13	6·9	1	83	725	20	2 1-prs.	2	16	10
Cycloop	Amsterdam	1887	125	13	6·9	1	83	680	20	2 1-prs.	2	16	10
Dempo	Amsterdam	1887	125	13	6·9	1	83	760	20	2 1-prs.	2	16	10
Empong	Poplar.. ..	1888	128	13	6·2	1	91	1,100	24·1	2 1-prs.	3	16	15
Etna	Poplar.. ..	1882	100	12·6	5·6	1	45	550	21·5	2 1-prs.	2	16	7
Foka	Amsterdam	1888	128	13	6·2	1	90	1,000	22·1	2 1-prs.	3		
Goentoer	Amsterdam	1888	128	13	6·2	1	90	950	21	2 1-prs.	3		
Habang	Amsterdam	1888	128	13	6·2	1	90	930	21·7	2 1-prs.	3		
Hekla	Poplar.. ..	1882	100	12·6	5·6	1	45	550	21·5	2 1-prs.	2	16	7
Idjen	Amsterdam	1889	128	13	6·2	1	90	840	20·6	2 1-prs.	3		
Krakatau	Amsterdam	1889	128	13	6·2	1	90	750	19·1	2 1-prs.	3		
Lamongan	Amsterdam	1890	104·5	13·3	5·2	1	50	790	20·7	2 1-prs.	2		
Makjan	Amsterdam	1890	104·5	13·3	5·2	1	50	790	20·7	2 1-prs.	2		
Nobo	Amsterdam	1890	104·5	13·3	5·2	1	50	790	20·7	2 1-prs.	2		
13 boats	..	pro.	160	..	..	..	..	..	..	..	..	..	..
4 boats	..	pro.	100	..	..	..	..	..	..	..	..	..	..
SECOND CLASS—													
Nos. 1, 2, 4–20 (19 boats)	Chiswick, etc.	1878–86	{ 76 79 }	10·3	5·2	1	29	250	18	1 1-pr.	2 sp	..	3
Nos. 3,21,2 (3 boats)	..	1890	83·6	10·5	5·1	1	37	460	17·9	1 1-pr.	1	..	3
1 boat	East Cowes	1883	45·5	9·7	..	1	..	..	12	1 mach.	1		
INDIAN FLEET—													
Cerberus	Flushing ..	1888	125	13	6·9	1	83	912	21·2	2-1 prs.	2	16	
1 boat	..	1891											
8 boats	..	1893–94	125	..	..	..	83	..	21·5	..	2		

Norway.

Name or Number.	Where Built.	Launched.	Dimensions.			Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Length.	Beam.	Draught.								
FIRST CLASS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Lyn	..	1882	94·2	9·7	2·5	1	36	430	18	..	1	..	3
Od	..	1882	97·5	11	5·6	1	40	450	18	..	1	..	3
Orm, Otter (2 boats)	..	1887	108·2	12·2	5·6	1	40	500	20	..	2	..	3
Pil, Rask (2 boats)..	..	1887	101·7	11·8	5·6	1	40	500	20	..	2	..	3
Snar	..	1887	104·9	11·8	5·6	1	40	500	20	..	2	..	3
Springer	..	1887	97·5	11·6	5·6	1	40	450	19	..	2	..	3
Varg (8), Raket (9)	Christiania..	1894	111·5	12·4	..	..	43	..	..	..	2	..	..
Hval, Delfin, Hai (3 boats)	Elbing ..	1896	128·0	15·0	..	..	95	1,000	24·5	2 1·4-in. Q.F.	2	..	..
SECOND CLASS—													
Rasp	Chiswick ..	1873	58	7·5	3·9	1	16	..	18	..	2		
Ulven	..	1878	56	..	..	1	16	..	9	..	sp.		
2 boats	..	..	..	..	..	..	20	..	12	..	..		

Portugal.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Fe:t.	Feet.	Feet.		Tons.		Knots.				Tons.
5 boats (5–9)	Elbing ..	1890–92											
Espadarte (1)	Poplar.. ..	1881	8[illegible]	11	5	1	31	450	19·7	2 mach.	2	10	10
Nos. 2, 3, 4 (3 boats)	Poplar.. ..	1886	120	12·5	5·5	1	60	700	20	2 mach.	2	16	18
Fulminante	Blackwall ..	1880	75	15	2·6	2	40	150	11·5	2 mach.	..	..	8
1 boat	..	..	..	..	..	..	25						
Mineiro	Lisbon ..	1893	..	..	..	..	..	..	12				
Submarine—													
Plongeur	..	1892	72·1	11·5	..	..	..	..	6				

Roumania.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
First Class—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Naluka	Havre	1888	120·7	11·3	6·9	1	55	500	21	1 1-pr. rev	2	..	12
Sborul	Havre	1888	120·7	11·3	6·9	1	..	500	21	1 1-pr. rev.	2	..	12
Smeul	Havre	1888	120·7	11·3	6·9	1	..	500	21	1 1-pr. rev.	2	..	12
Second Class—													
Szimul	Poplar.. ..	1882	63	8	3	1	15	150	16·5	..	..	8	1
Vulturul	Poplar.. ..	1882	63	8	3	1	15	150	16·5	..	..	8	1

Russia.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
BALTIC SEA.													
Destroyer—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons
Sokol	Poplar.. ..	1895	190	18·6	7.0	2	240	4,400	29.7	1 12-pr. 3	2	..	60
2 Sokol type	Ishora	Bldg.											
1 Sokol type	Abo	Bldg.											
First Class—										6-pr.			
Aspen	Kolpiro ..	1895	127·9	15·7	6·9	1	98	1,250	21	..	2	..	17
Abo	Elbing ..	1886	128	15·7	7·5	1	87	900	22·2	4 1-pr. revs.	2	13	17
Bjerke	Putiloff ..	1890	136·5	13	7·8	..	81	1,100	21				
Dago	Abo	1891	152	13	8·3	..	100	1,000	19				
Domeness	Putiloff ..	1895	127·9	15·7	6·9	1	98	1,250	21	..	2	..	17
Eckness	Abo	1890	136·5	13	7·8	..	81	1,100	21				
Hapsal	Putiloff ..	1891	126	13	8·5	1	81	1,100	21	2 1-pr. revs.	2	13	
Hogland	Ishora ..	1894	128	16	6·9	1	85	1,200	22	2 1-prs.	2	13	17
Kotka	Abo	1891	152	13	8·3	..	100	1,000	19				
Kotlinj	St. Petersburg	1885	124·2	12·9	5·9	2	67	500	16·5	2 1-pr. revs.	2	16	15
Kronschlot	Kolpiro ..	1891	152	13	8·3	..	100	1,000	19				
Lachta	Elbing ..	1886	128	15·7	7·5	1	87	900	20	4 1-pr. revs.	2	13	17
Libawa	Elbing ..	1886	128	15·7	7·5	1	87	1,000	22	4 1-pr. revs.	2	13	17
Louga	Elbing ..	1886	128	15·7	7·5	1	87	900	20	4 1-pr. revs.	2	13	17

Russia—*continued.*

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
FIRST CLASS—*contd.*			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Moonsund	Putiloff ..	1891	126	13	8·5	1	81	1,100	21	2 1-pr. revs.	2	13	
Nargen	Itschora ..	1894	128	16	6·9	1	85	1,200	22	2 1-prs.	2	13	17
Narwa	Elbing ..	1886	128	15·7	7·5	1	87	900	20	4 1-pr. revs.	2	13	17
Pernoff	Normand ..	1892	138	14·7	9·9	2	118	1,000	25·4	2 mach.	2	26	
Rochensalm	Putiloff ..	1890	136·5	13	7·8	..	81	1,100	21				
Seskar	Kolpiro ..	1891	152	13	8·3	..	100	1,000	19				
Sestoresk	Normand ..	1893	118	13·2	8·7	2	130	1,900	25	2 1-prs.	2	21	10
Tosna	Putiloff ..	1893	127·9	15·7	6·9	1	98	1,250	21	..	2	13	17
Transund	Kolpiro ..	1895	127·9	15·7	6·9	1	98	1,250	21	..	2	..	17
Viborg	Clydebank ..	1886	144·5	17	8·1	2	126	1,400	20	2 3-pr. revs.	3	24	45*
Vindawa	Elbing ..	1886	128	15·7	7·5	1	87	900	21	4 1-pr. revs.	2	13	17
Vzriw	St. Petersburg	1877	118	16	10·9	1	160	800	14·5	4 Q.F.	1	18	16
8 boats	St. Petersburg	1894	128	16	6·9	1	85	1,200	22	2 1-prs.	2	13	17
2 boats	Putiloff ..	1894	138	14·7	9·9	2	118	..	25	2 mach.	2	26	
2 boats	St. Petersburg	1896	128	16	6·9	2	85	1,200	22	2 1-prs.	2	13	17
6 boats	St. Petersburg	Bldg.	138	14·7	9·9	2	120	..	25	..	2	26	
†8 boats	St. Petersburg	Bldg.	..	..	..	..	118						
SECOND CLASS—													
21 boats (Galka class)	Elbing and Russia ..	1880 &c.	74·7	8·9	5	1	30	220	16	..	2	14	3
21 boats (Woron class)	Elbing and Russia ..	..	66	11·1	..	1	..	260	17				
1 boat	Poplar.. ..	1888	60	8·5	3	1	16	240	17·5	..	2	..	1
Submarine (Pakaloff type)	Cronstadt ..	Bldg.	19	..	..	..	..	..	10				
BLACK SEA.													
FIRST CLASS—													
A. B. C. (3 boats) ..	Nicolaieff ..	1893	126	..	..	..	81	..	21				
Adler..	Elbing ..	1890	152·0	17·2	7·9	2	130	2,200	27·4	2 1-prs.	3	24	40
Anakria	Elbing ..	1890	128·0	16	6·9	1	85	1,200	22	2 1-prs.	2	13	17
Anapa	Odessa.. ..	1891	126	13	8·5	1	81	1,100	21	2 1-pr. revs.	2	13	
Aitodorj	Odessa.. ..	1891	126	13	8·5	1	81	1,100	21	2 1-pr. revs.	2	13	
Batoum	Poplar.. ..	1880	100	12·5	5·5	1	40	500	22	2 1-pr. revs.	2	12	9
D. E. (2 boats) ..	Sebastopol ..	1893	128	..	..	..	85	..	22				
Gagri	Claparède ..	1883	120·6	13·3	7	1	78	600	18	2 1-pr. revs.	2	13	12
Gelendshik	La Seyne ..	1883	122·7	12·4	6·2	1	73	560	18	2 1-pr. revs.	2	13	11
Ismail	Nicolaieff ..	1886	128	15·7	7·5	1	87	900	20	2 1-pr. revs.	2	13	17
Itzvar	Odessa.. ..	1891	..	..	..	..	81	1,100					
Kodor	Elbing ..	1886	128	15·7	7·5	1	87	900	21	4 1-pr. revs.	2	13	17
Kilia..	Elbing ..	1886	128	15·7	7·5	1	87	900	22	4 1-pr. revs.	2	13	17
Novorossisk	Elbing ..	1886	128	15·7	7·5	1	87	900	22	4 1-pr revs.	2	13	17
Poti	Normand ..	1883	124·6	11·9	6·7	1	72	570	18·5	2 1-pr. revs.	2	13	11
Reni	Elbing ..	1886	128	15·7	7·5	1	87	900	22	4 1-pr. revs.	2	13	17
Sookhoum	Chiswick ..	1883	113	12·5	6	1	64	700	19.5	2 Nords.	2	13	10
Tchardak	Elbing ..	1886	128	15·7	7·5	1	87	900	20	4 1-pr. revs.	2	13	17
Yalta..	Elbing ..	1886	128	15·7	7·5	1	87	900	22	4 1-pr. revs.	2	13	17
3 boats	Elbing ..	1886	128	15·7	7·5	1	87	900	22	4 1-pr. revs.	2	13	17
6 boats	Nicolaieff ..	Bldg.	..	..	..	..	..	..	..	..	..	..	..
SECOND CLASS—													
Istcheritza	Sebastopol ..	1878	62·3	9·7	3·9	1	24	220	15	..	..	10	
Karabin	Elbing.. ..	1877	64·3	8·4	2	1	11	120	15	..	..	8	
Kefal..	Chiswick ..	1880	60·5	7·5	3·5	1	..	..	16·8	..	..	8	
Scheglensk	Sebastopol ..	1878	59·3	9·5	3·9	1	24	220	15	..	..	10	
Schehouka	Sebastopol ..	1878	59·3	9·5	3·9	1	24	220	15	..	..	10	
Scoombia	Odessa.. ..	1878	61·3	10	4	1	25	220	15	..	..	10	
Soroka	St. Petersburg	1878	62.3	9·7	3·9	1	24	220	15	..	..	10	
Soulin	..	1877	60	9·7	3·9	1	24	210	15	..	..	10	
Sultanka	Odessa.. ..	1878	64·3	10	4	1	25	220	15	..	..	10	
1 boat	Poplar	1877	75	10	..	..	..	..	..	..	..	..	
50 boats (Woron Class)	Elbing, etc.	..	66	11·1	..	1	..	260	17				
SIBERIAN FLOTILLA.													
Borgo	Abo	1890	136·5	13	7·8	..	81	1,100	21				
Forel..	..	..	71·5	6·5	3·3	1	23	220	16				
Jantchiche	Elbing.. ..	1887	128	15·7	11·5	..	87	970	19	4 1-pr. revs.	2	13	17
N.	..	1893	152·5	16·8	..	..	140	2,200	26·5	2 1-pr. revs.	3	24	40
N.	..	1893	152·5	16·8	..	..	140	2,200	26·5	2 1-pr. revs.	3	24	40
Podorosnik	..	..	71·5	6·5	3·3	1	23	220	16				
Revel	Normand ..	1886	152·3	12·3	8·1	1	96	780	22	2 Q.F.	2	23	30
Sisik	..	..	71·5	6·5	3·3	1	23	220	16				
Skorpion	..	..	71·5	6·5	3·3	1	23	220	16				
Sootchena..	Elbing.. ..	1887	128	15·7	11·5	..	87	970	19	4 1-pr. revs.	2	13	17
Sterliad	..	..	71·5	6·5	3·3	1	23	220	16				
Strauss	..	..	71·5	6·5	3·3	1	23	220	16				
Sunguri (*ex* Hogland)	Abo	1890	152	16	7·9	2	140	1,800	22				
Sweaborg	Normand ..	1886	152·3	12·3	8·1	1	96	780	19·7	2 Q.F.	..	..	30
Ussuri (*ex* Nargen)	Abo	1890	152	16	7·9	2	140	1,800	22				

* Has received liquid fuel apparatus. † Of the Pernoff type, building on the Neva.

Spain.

Name or Number.	Where Built.	Launched.	Dimensions.			Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Length.	Beam.	Draught.								
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Furor .. .. .. Terror	Clydebank ..	1896	220	22	5·6	2	3	6,000	28	2 12-pr. 2 6-pr. 2 1-pr.	2	67	100
Audaz .. .. .. Osado .. .. .. Plutón .. .. .. Proserpina	Clydebank ..	Bl'g.	225	22.6	5·8	2	400	..	30	2 12-pr. 2 6-pr. 21-pr.	2	70	100
FIRST CLASS—													
Acevedo	Chiswick ..	1885	117·7	12·5	6·2	1	63	660	20·1	2 mach.	2		
Ariete	Chiswick ..	1887	147·5	14·6	4·9	2	97	1,600	26·1	4 3-pr. Q.F.	2	..	25
Azor	Poplar.. ..	1887	134·5	14	6	1	108	1,600	24	4 3-pr. Q.F.	3	23	25
Barcelo	Normand ..	1886	126	10·9	..	..	65	800	19·5	2 1-in. Nord.	2		
Bustamente	Normand ..	1887	126	10·9	..	..	63	800	..	3 3-prs.	2		
Ejercito	Kiel	1887	111·5	13	3·3	..	60	1,000	25	2 mach.	2		
Habana	Chiswick ..	1887	127·5	12·5	6	1	59	730	21·3	1 mach.	2		
Halcon	Poplar.. ..	1887	134·5	14	..	1	108	1,600	24	4 3-pr. Q.F.	3	23	25
Julian Ordoñez ..	Chiswick ..	1885	117·7	12·5	6·2	1	65	660	20·1	2 1-in. Nord.	2		
Orion..	Gaarden ..	..	125	15·5	3·5	1	85	1,000	21·5	2 1-pr. revs.	2	18	16
Rayo..	Chiswick ..	1887	147·5	14·6	4·9	2	97	1,600	25·5	4 3-pr. Q.F.	2	..	25
Retamosa..	Poplar.. ..	1886	118	12·5	5·5	1	70	700	20·5	2 1-in.	2	17	20
Rigel..	Bremen ..	1883	105	12·3	3·3	1	57	..	19	1 1-pr. rev.	2	18	13
Seza	Ferrol.. ..	1885	126	..	..	..	85	..	14				
4 boats	..	Bldg.	147	43.0	5	..	98	1,600	25			25	25
2 boats	Clydebank ..	Bldg.	..	..	..	..	..	..	28				
SECOND CLASS—													
Aire	Spain	1883	43·4	10·2	3	2	25	175	8	1 3·1-in.	..	16	1
Castor	La Seyne ..	1878	76·2	9·7	2·3	..	23	265	19	..	..	14	1·5
Pollux	Poplar.. ..	1879	84·5	10·7	4·6	..	33	450	19·5	..	2	14	9
VEDETTE BOATS—													
3 boats	East Cowes	1892	60	9·3	..	..	..	..	18·3				
Peral..	Carraca ..	1889	70	8·5	..	2	87	60	10				

Sweden.

Name or Number.	Where Built.	Launched.	Dimensions.			Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Length.	Beam.	Draught.								
FIRST CLASS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
3 boats	Stockholm ..	1886	114·4	12·4	6·4	1	60	600	18	1 mach.	2	12	15
Hugin (1)	Chiswick ..	1884	113	12·5	6·2	1	65	620	19·2	1 mach.	2	12	11
Nos. 9 (Gondul), 11 (Gudur)	..	1893	..	..	..	..	..	..	..	2 mach.	2		
Komet	Elbing ..	1896	128	..	..	..	90	1,000	24·5				
SECOND CLASS—													
Agda (77)	Carlskrona..	1891	100·4	11·3	5·8	1	40	450	19	1 mach.	2	12	7·5
Agne (75)	Stockholm ..	1891	100·4	11·3	5·8	1	40	450	19	1 mach.	2	12	7·5
Blink (61)	Stockholm ..	1882	91·5	11·7	5·2	1	34	350	16	..	1	10	8
Blixt (63)..	..	1883	100·4	11·6	5·4	1	40	360	18	..	2	12	7
Bygve (71)	Stockholm ..	1889	103·2	11·6	5·8	1	41	360	18	..	2	12	9
Bylgia (73)	Stockholm ..	1889	103·2	11·6	5·8	1	41	360	18	..	2	12	9
Galdr (65)	Stockholm ..	1885	100·4	11·6	5·4	1	40	425	18·5	..	2	12	7·5
Narf (67)..	Stockholm ..	1886	101·2	11·6	5·7	1	40	450	19	..	2	12	7·5
Nörve (69)	Stockholm ..	1886	101·2	11·6	5·7	1	40	450	19	..	2	12	7·5
Rolf	Stockholm ..	1882	91·5	11·7	5·2	1	34	390	17	..	1	10	8
Seid	Chiswick ..	1882	100	12	5	1	40	360	20·7	1 mach.	2	12	8
THIRD CLASS—													
Nos. 141, 143, 145, 147, 149, 151 (6 boats)	Stockholm ..	1879–90	55	10·7	4·1	2	21	80	10	..	2	..	1·5
Glimt (101)	Chiswick ..	1875	58	7·6	3	1	5	60	18	..	2	..	1·5

Turkey.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Dimensions. Beam.	Dimensions. Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Berk-Efshan	Gaarden ..	1894	187	21·6	..	2	270	200	25	6 1-pr. revs.	2		
Tajjar	Gaarden ..	1894	187	21.6	..	2	270	..	25	6 1-pr. revs.	2		
FIRST CLASS—													
Edjder (No. 10) ..	Gaarden ..	1890	152·7	18·9	7·4	2	150	2,200	23	5 3-prs. Q.F.	2		
1 boat	Constantinople	1889	140	16	6·9	2	120	1,800	23	5 1-pr. revs.	2		
5 boats	Gaarden ..	1889–90	126·7	15·4	8·6	1	85	1,300	22	2 1-pr. revs.	2	21	8
Timsah	London ..	1887	126	15	..	..	..	..	21·7				
5 boats	Elbing ..	1886	120·3	16·2	..	..	85	900	21	2 Nords.	2	20	10
4 boats	Constantinople	1886–89	100·3	11·8	5·5	1	42	550	19·5	2 mach.			
Tewfik	Normand ..	1885	100·7	13	5·5	1	42	550	20				
2 boats	La Seyne and Constantinople	1885	100·7	13	5·5	1	42	550	20·3	2 Nords.			
2 boats	Teddington	1887	124	15	..	..	..	..	22				
2 boats	Kiel	1892	127	..	..	..	..	..	22				
SUBMARINE—													
Abdul Hamid	Chertsey ..	1886	100	12	..	3	160	250	10	2 mach.	1	..	8
Abdul Medjid	Chertsey ..	1886	100	12	..	3	160	250	10	2 mach.	1	..	8

United States.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Dimensions. Beam.	Dimensions. Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
2 boats	..	Pro.	..	..	..	..	226	..	30	..	..	..	..
1 boat	Herreshoff ..	Pro.	..	..	..	..	250	..	30	..	..	..	..
FIRST CLASS—													
Cushing	Bristol, R.I.	1890	138·9	14·1	5·3	2	116	1,720	22·5	2 3-pr. Q.F.	3	21	
Ericsson	Dubuque, I.	1892	150	15·6	4·9	2	120	1,800	23	4 3-pr. Q.F.	3	21	40
3 boats (Nos. 9, 10, 11)	Baltimore ..	1896	160	16	5·0	2	135	2,000	24·5	4 3-pr. Q.F.	3	..	50
3 boats (Nos. 6, 7, 8)	Bristol ..	1896	170	17	5·5	2	185	3,500	27·5	4 1-pr. Q.F.	3		
10 boats .. .. .. {	..	Pro.	139·9	14·4	4·7	..	105	1,700	22·5	3 1-pr. Q.F.	3	..	..
	..	Pro.	104·9	12·4	4·5	..	68	850	20	1 1-pr. Q.F.	2	..	16
SECOND CLASS—													
Stiletto	Bristol, R.I.	1886	88·6	11	3	1	30	350	18·2	..	2	..	6
VEDETTE BOATS—													
2 boats	New York	1895	61·7	9	..	1	15	..	18	1 1-pr.	1	..	1
2 boats	Norfolk, Va.	1895	50	9	..	1	12	..	17	1 1-pr.	1	..	·75
SUBMARINE—													
1 boat (Holland) ..	New York	Bldg.	80	11·0	..	2	118*	1,800	{13½ / 16½ sub.}	..	2	..	..
Unnamed	Elizabeth Port	Bldg.	50	9·10	..	..	..	..	30·0	2 guns.	1	..	..

* 138 tons awash, 138½ tons submerged.

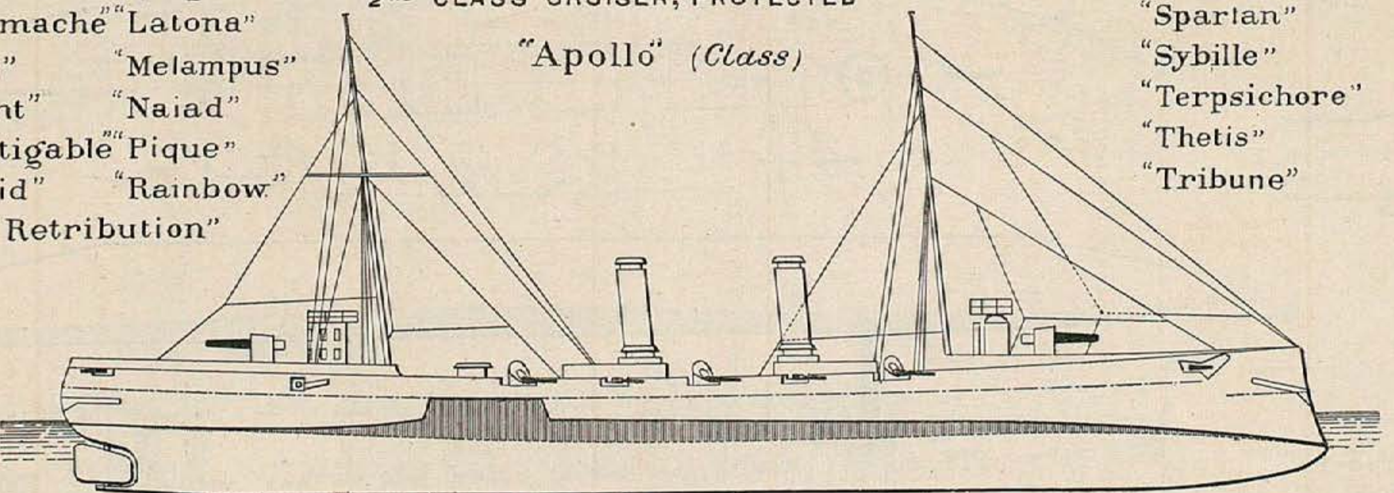
GREAT BRITAIN.

2ND CLASS CRUISER, PROTECTED

"Apollo" (Class)

"Æolus" "Iphigenia"
"Andromache" "Latona"
"Apollo" "Melampus"
"Brilliant" "Naiad"
"Indefatigable" "Pique"
"Intrepid" "Rainbow"
"Retribution"

"Scylla"
"Sirius"
"Spartan"
"Sybille"
"Terpsichore"
"Thetis"
"Tribune"



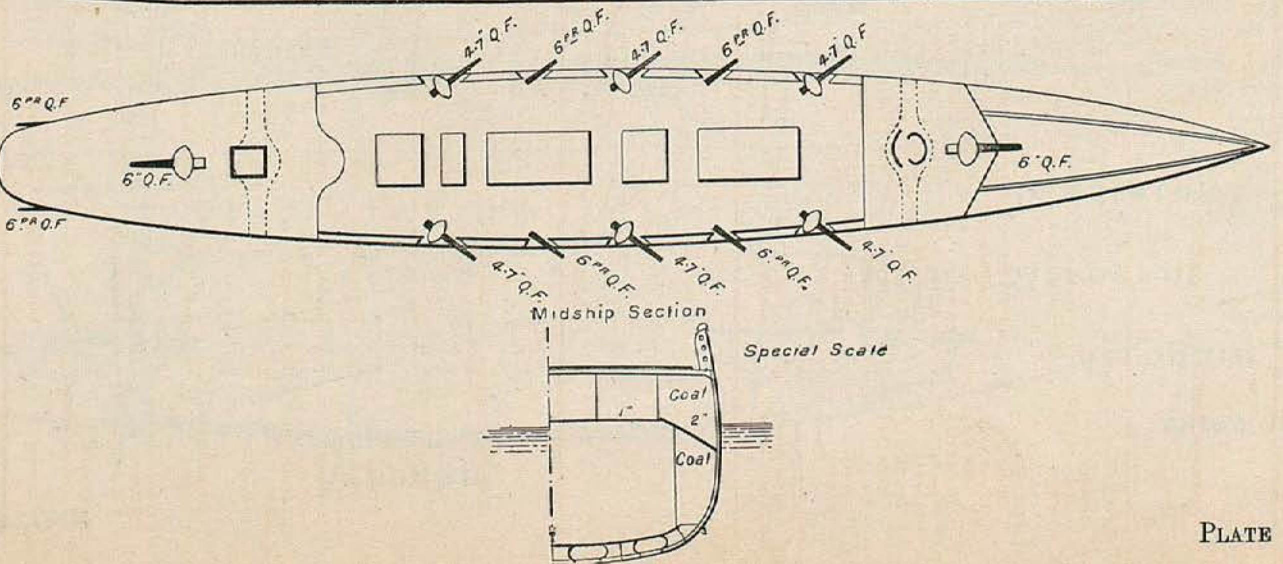


PLATE 1.

a

GREAT BRITAIN

"Arrogant"

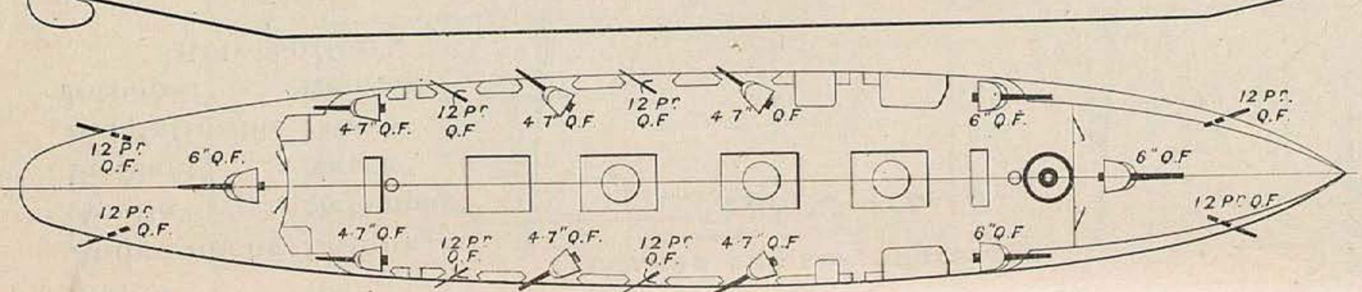
2nd Class Cruiser

SHIPS OF

"Arrogant" Class

"Arrogant" "Furious"

"Gladiator" "Vindictive"



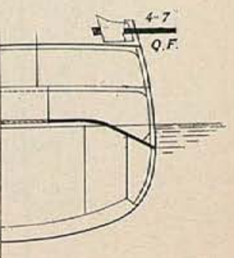


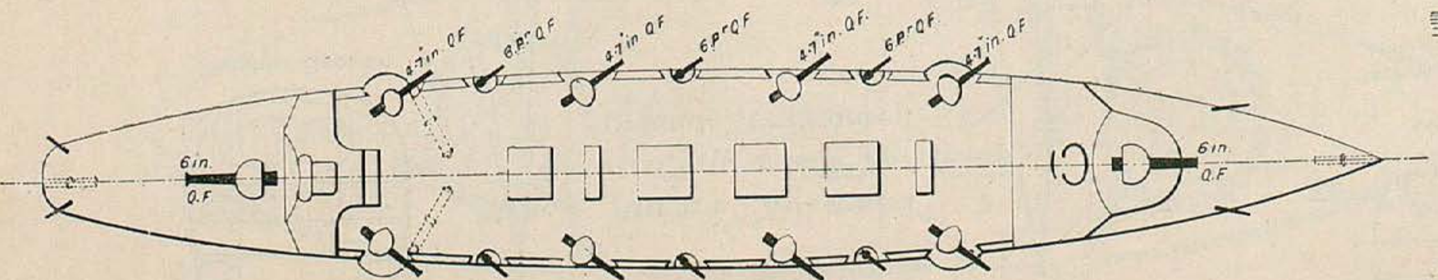
PLATE 2.

"Astræa"
"Bonaventure"
"Cambrian"
"Charybdis"
"Flora"
"Forte"
"Fox"
"Hermione"

GREAT BRITAIN

2ND CLASS PROTECTED CRUISERS

"Astræa" (*Class*)



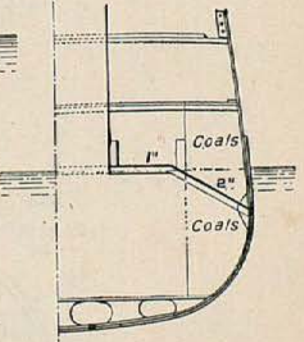
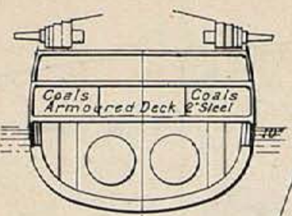


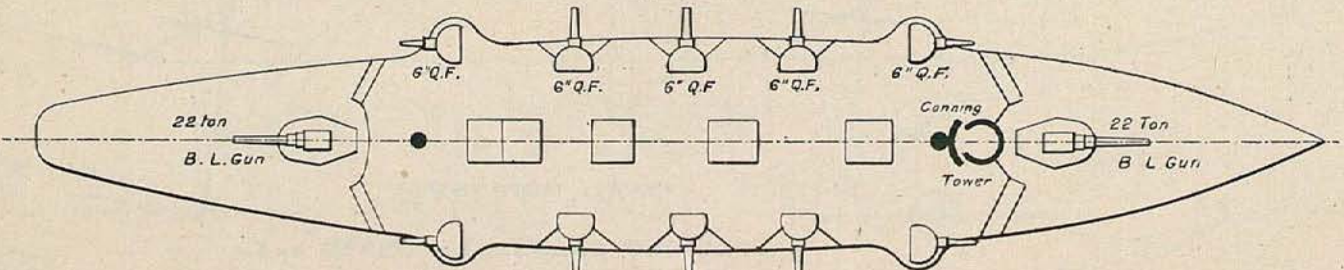
PLATE 3.

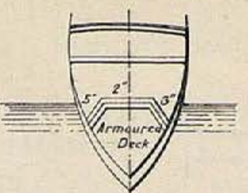
GREAT BRITAIN

"Aurora", "Australia" "Galatea", "Immortalité", "Narcissus" "Orlando", "Undaunted"



Midship Section





Section outside Armour Belt

PLATE 4.

"Benbow"

14

18"

L.W.L

Spar Deck

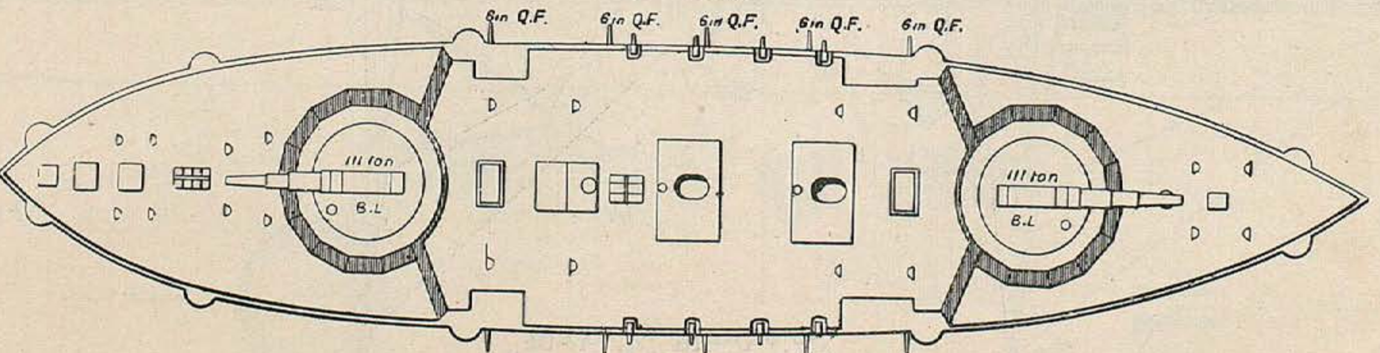


Plate 5.

GREAT BRITAIN

1ST CLASS .PROTECTED CRUISERS

"Blake" & "Blenheim"

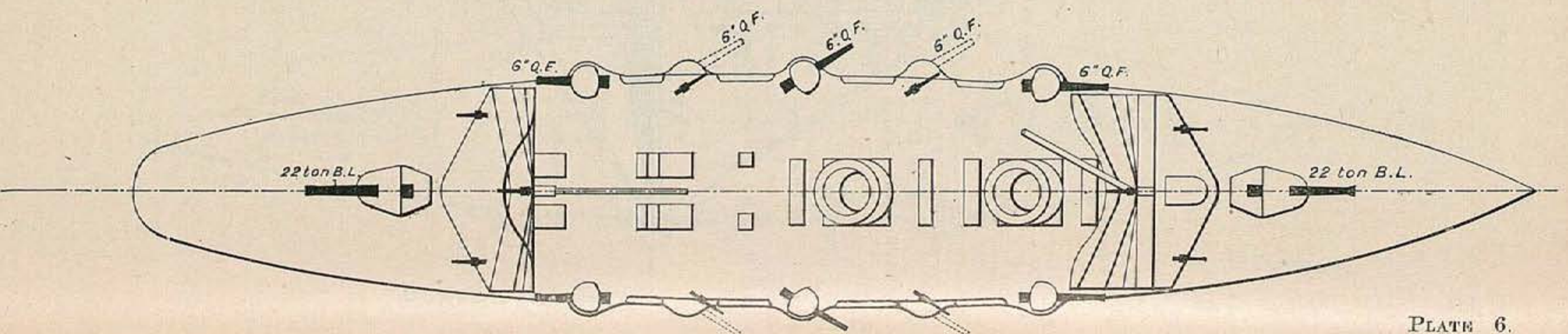


PLATE 6.

GREAT BRITAIN

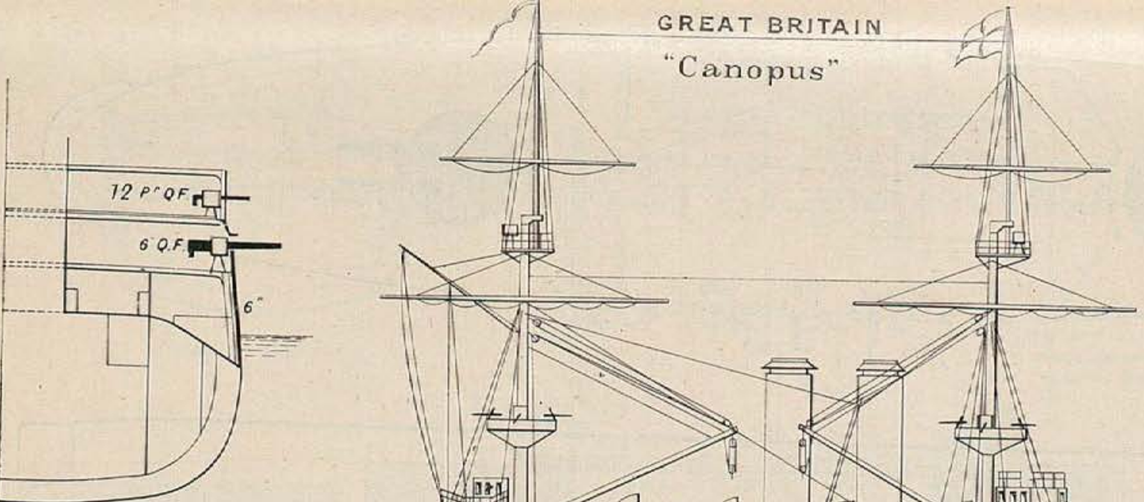
"Canopus"

SHIPS OF
"Canopus" Class

"Albion" "Glory"

"Canopus" "Goliath"

"Ocean"



GREAT BRITAIN

FIRST CLASS BATTLE SHIPS

"Centurion" & "Barfleur"

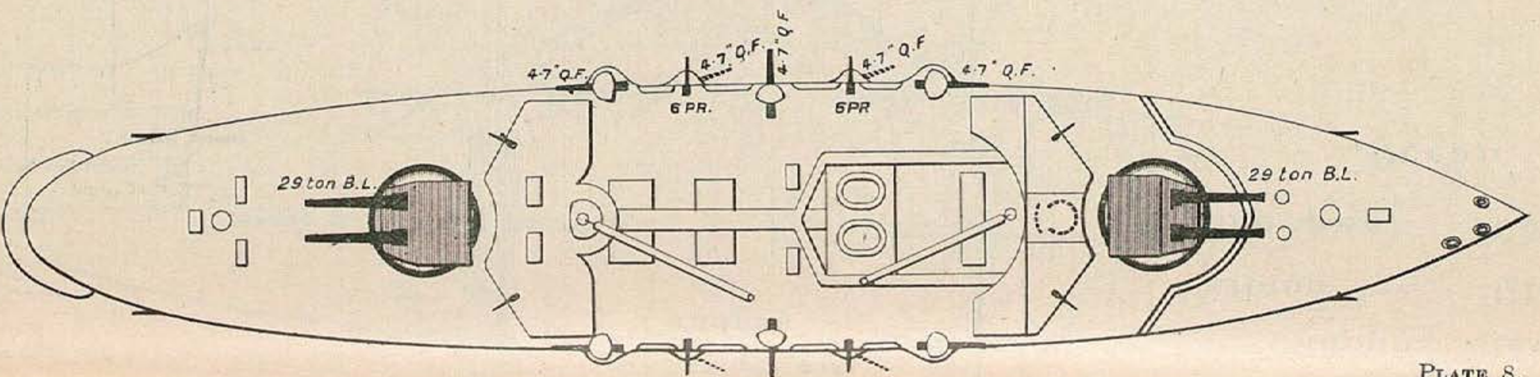


PLATE 8.

GREAT BRITAIN

H.M.S. "Collingwood"

ALSO ON SLIGHTLY DIFFERENT DIMENSIONS

"Howe" "Rodney" "Anson" & "Camperdown"

6" Q.F. 6" Q.F.

Midship Section

Length between the perpendicular	325.0
Breadth extreme	68. 0
Displacement in tons	9500
Indicated Horse Power	7000.

14" 16" 6" Q.F. 6" Q.F. 6" Q.F. 6" 18" 15" 14" L.W.L.

Plan of Spar and Upper Deck

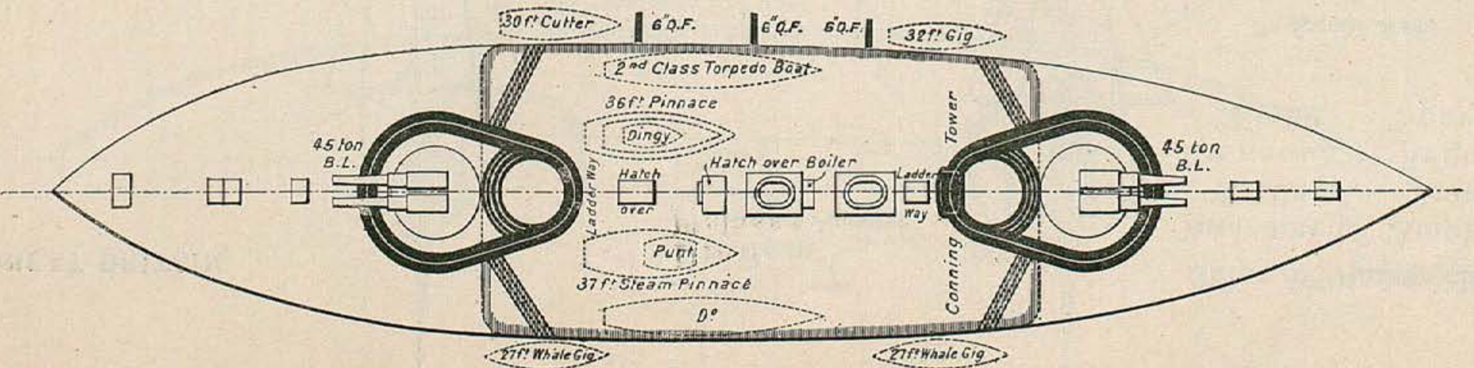


PLATE 9.

GREAT BRITAIN.

"Diadem"
1st class. Cruisers

Ships of "Diadem" class

"Andromeda" "Amphitrite"
"Diadem" "Ariadne"
"Europa" "Argonaut"
"Niobe" "Spartiate"

On Special Scale.

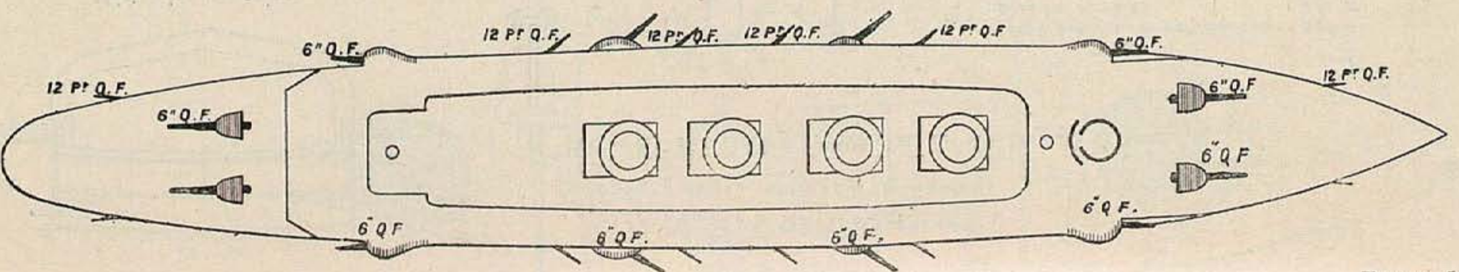
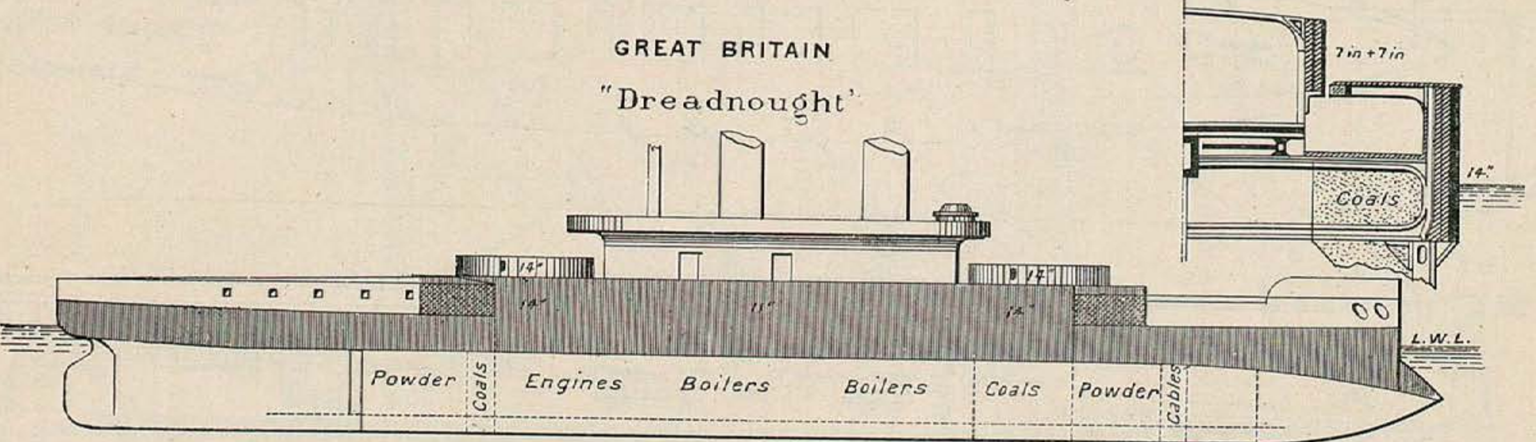


PLATE 10.

GREAT BRITAIN

"Dreadnought"



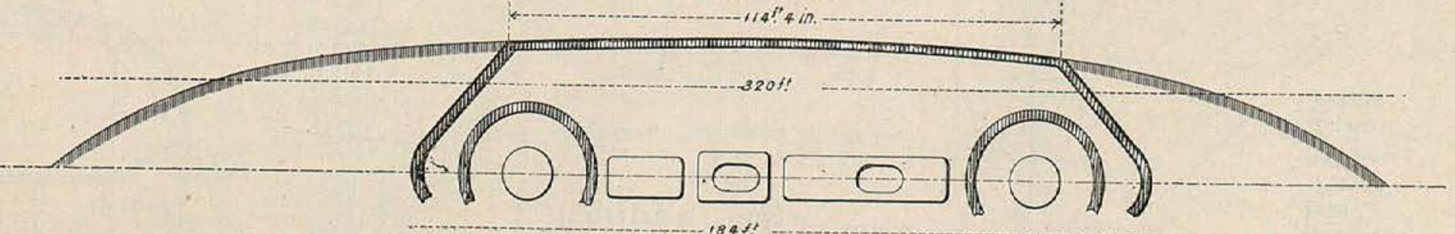


PLATE 11.

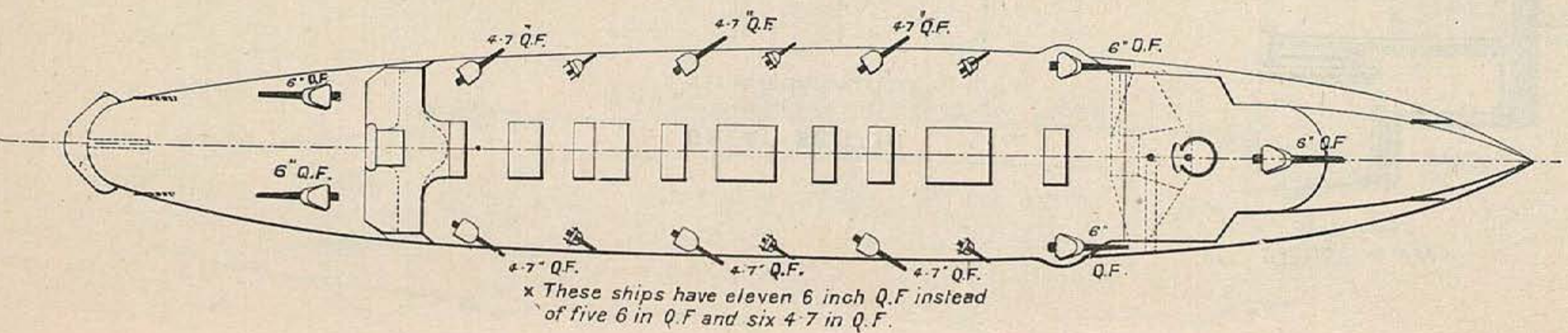
GREAT BRITAIN

2nd CLASS PROTECTED CRUISERS

"Eclipse" Class

"Diana" "Dido" "Doris" "Eclipse" "Isis" "Juno" "Minerva" "Talbot" "Venus"

"Hermes ×
Highflyer ×
Hyacinth ×



× These ships have eleven 6 inch Q.F instead of five 6 in Q.F and six 4·7 in Q.F.

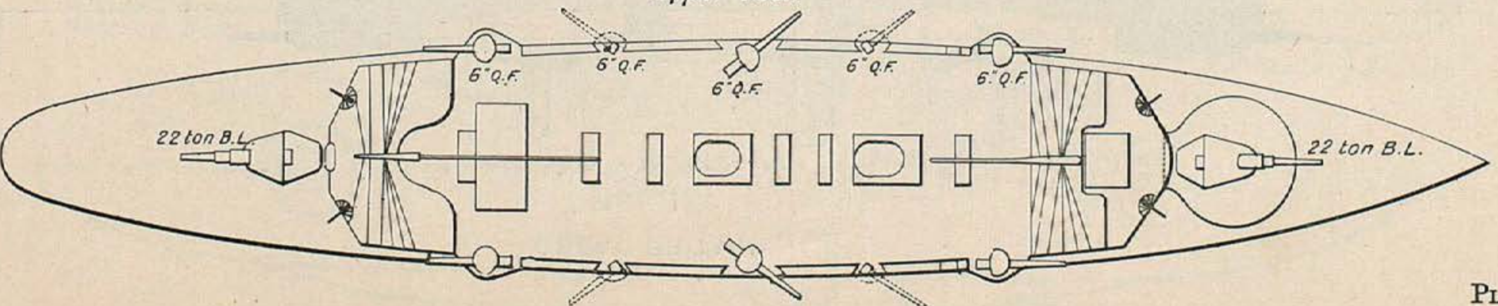
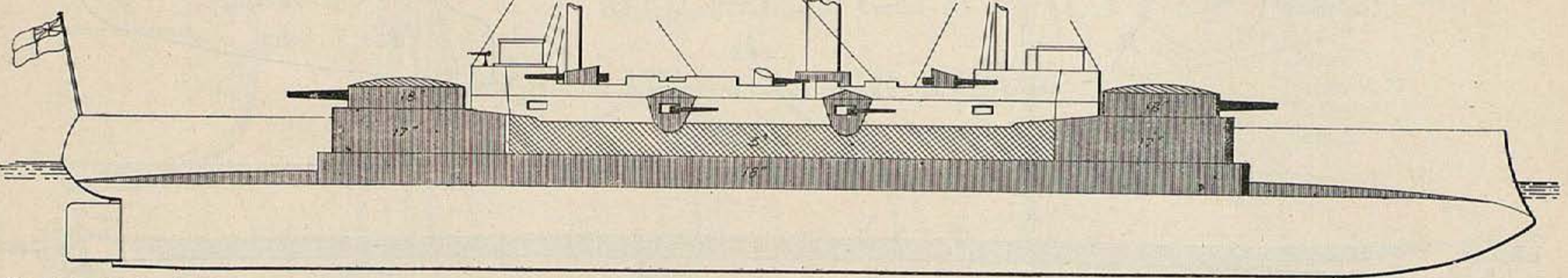

GREAT BRITAIN
FIRST CLASS PROTECTED CRUISERS
"Crescent" "Grafton"
"Edgar" "Hawke"
"Endymion" "Royal Arthur"
"Gibraltar" "St George"
"Theseus"
"Edgar" Class
Midship Section
On Special Scale
Passage
1"
Coal
5"
Coal
Wing
L.W.L.
Upper Deck
6" Q.F.
6" Q.F.
6" Q.F.
6" Q.F.
6" Q.F.
22 ton B.L.
22 ton B.L.

PLATE 13.

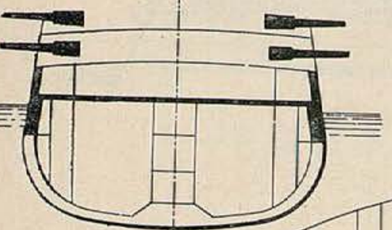
GREAT BRITAIN

"Hood"

TURRET SHIP WITH REDOUBTS



On Special Scale



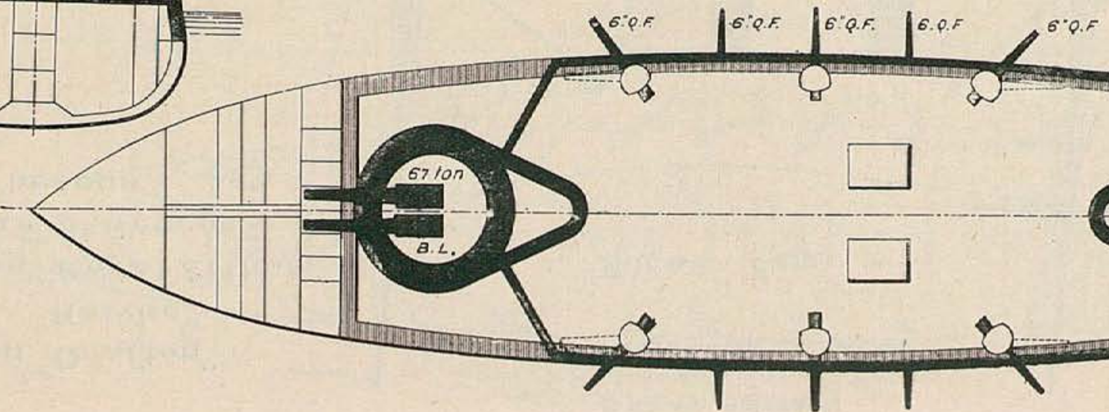
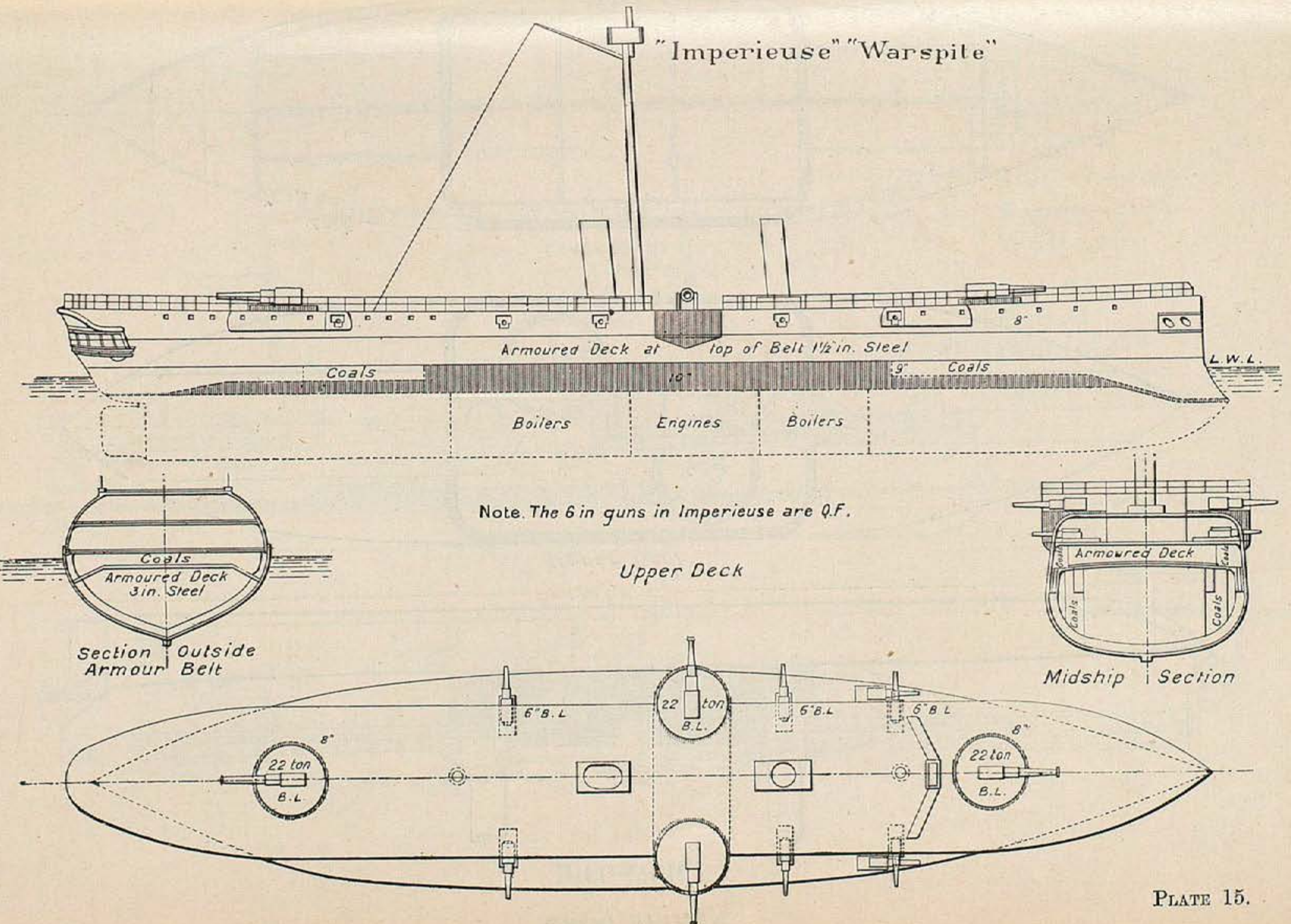
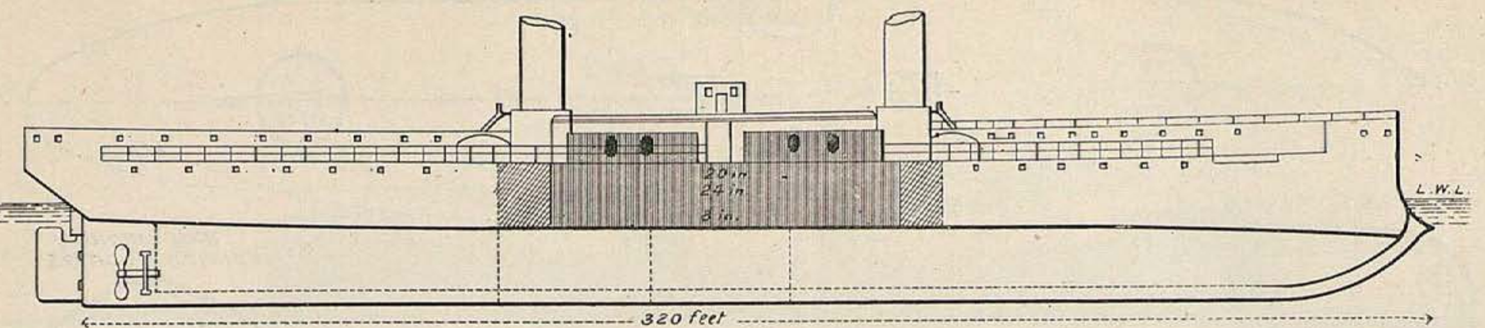


PLATE 14.

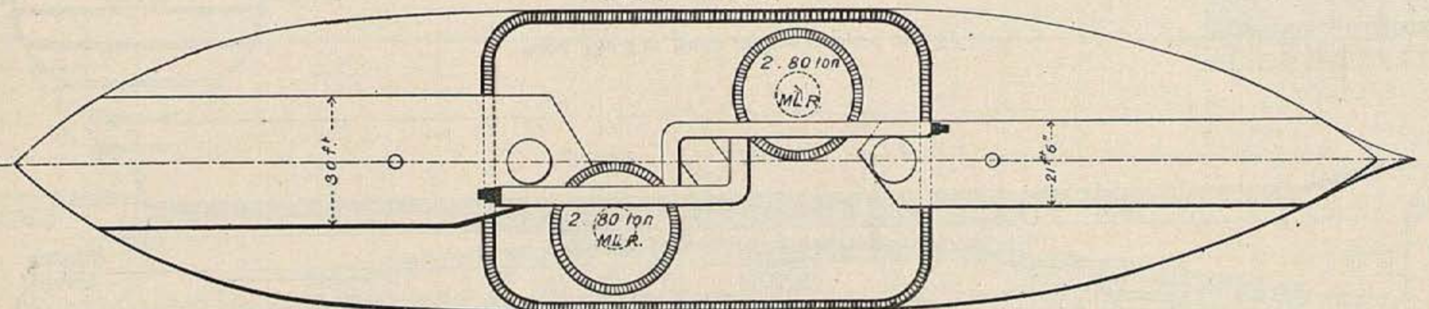

"Imperieuse" "Warspite"
8"
Armoured Deck at top of Belt 1½ in. Steel
L.W.L.
Coals
10"
9"
Coals
Boilers
Engines
Boilers
Note. The 6 in guns in Imperieuse are Q.F.
Upper Deck
Coals
Armoured Deck
3 in. Steel
Section Outside
Armour Belt
Armoured Deck
Coals
Coals
Midship Section
6" B.L
22 ton
B.L.
6" B.L
6" B.L
8"
22 ton
B.L.
8"
22 ton
B.L.

GREAT BRITAIN

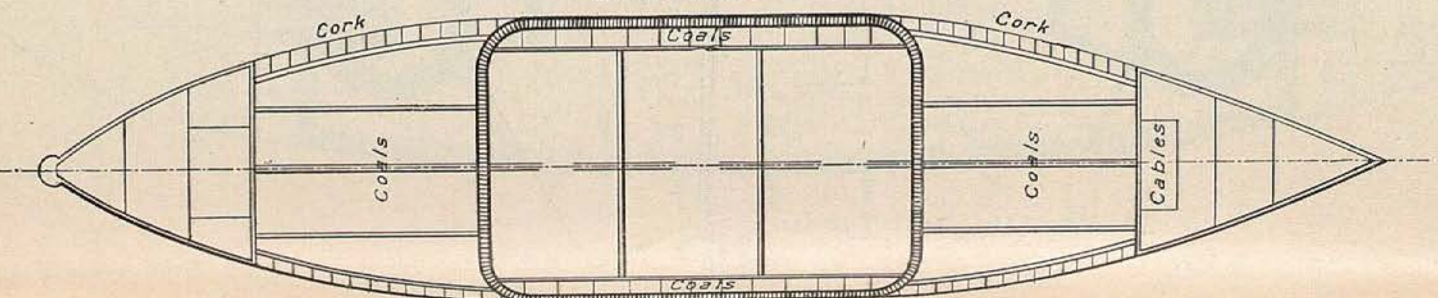
"Inflexible"



Upper Deck



Lower Deck



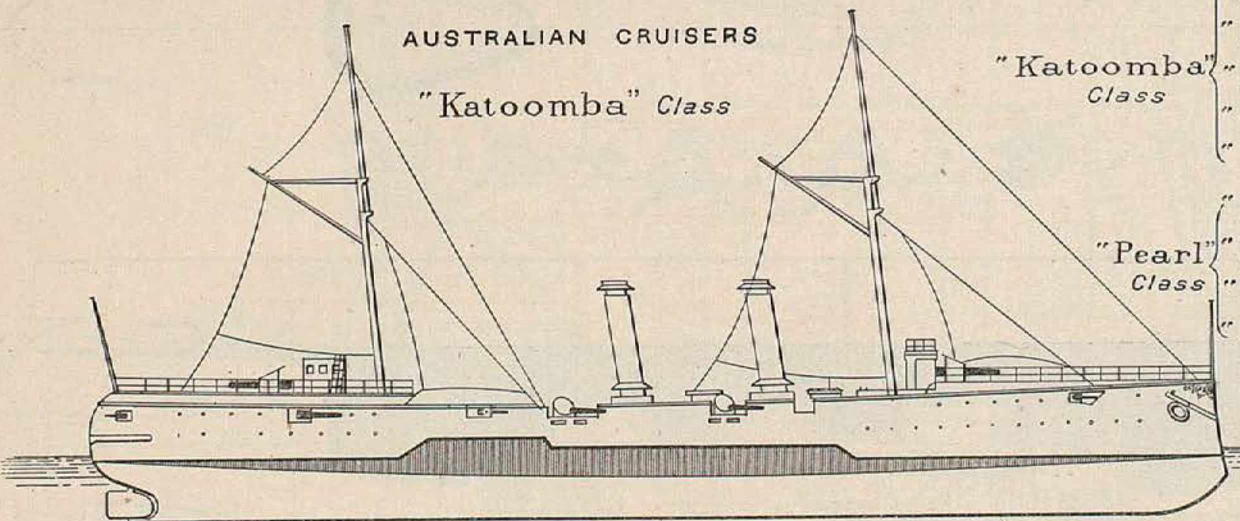
GREAT BRITAIN

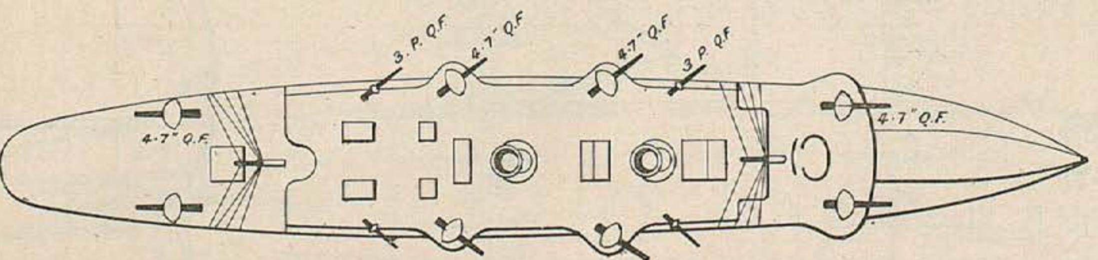
AUSTRALIAN CRUISERS

"Katoomba" Class

"Katoomba" Class: "Katoomba", "Mildura", "Ringarooma", "Tauranga", "Wallaroo"

"Pearl" Class: "Pallas", "Pearl", "Philomel", "Phœbe"





On Special Scale

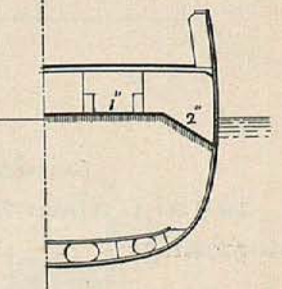


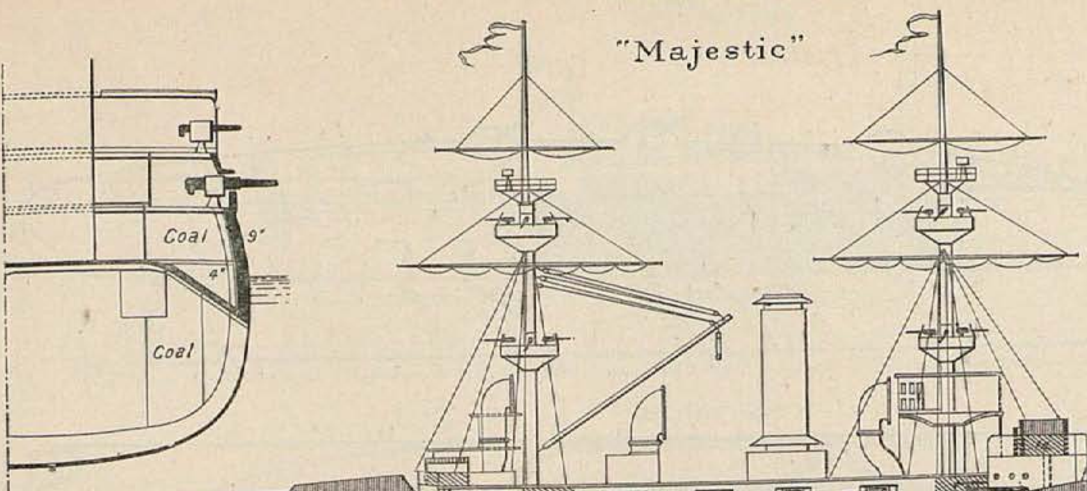
PLATE 17.

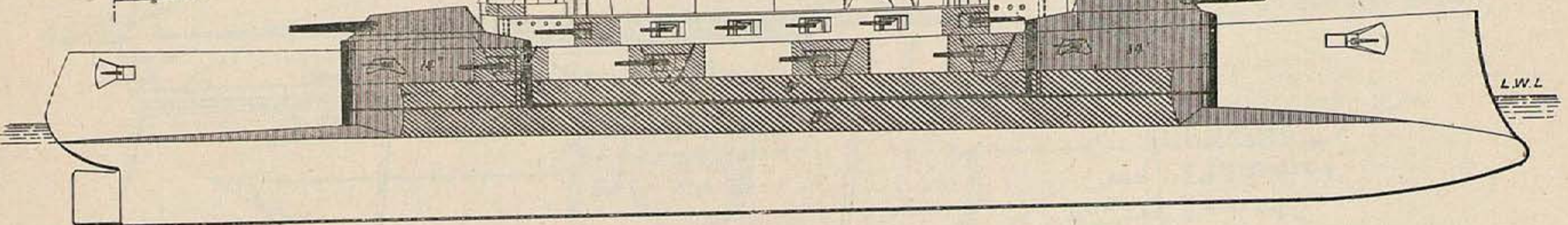
GREAT BRITAIN

"Majestic"

"Majestic" Class

"Majestic"	"Victorious"
"Magnificent"	"Mars"
"Hannibal"	"Illustrious"
"Prince George"	"Cœsar"
"Jupiter"	





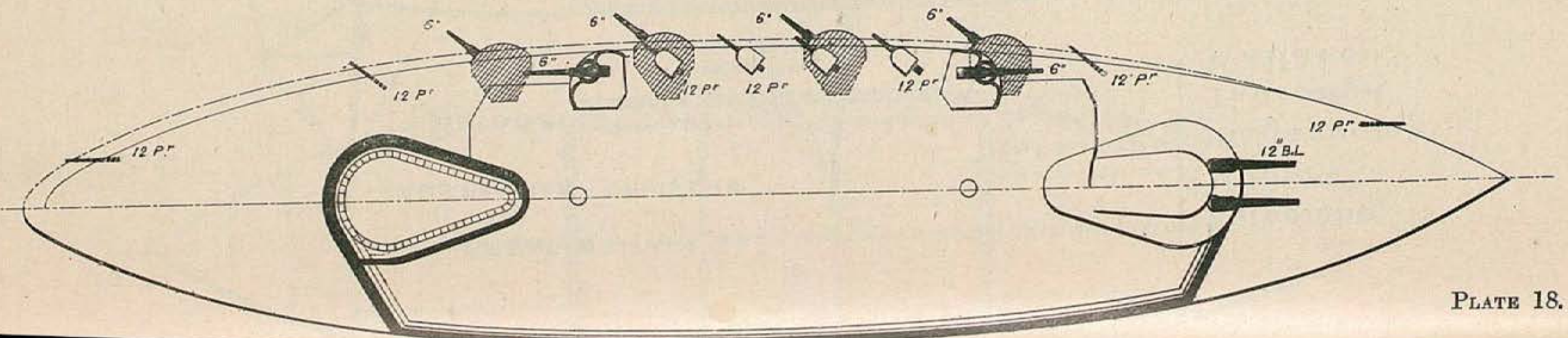


PLATE 18.

GREAT BRITAIN.

"Powerful"
"Terrible"
First Class Cruisers.

On Special Scale

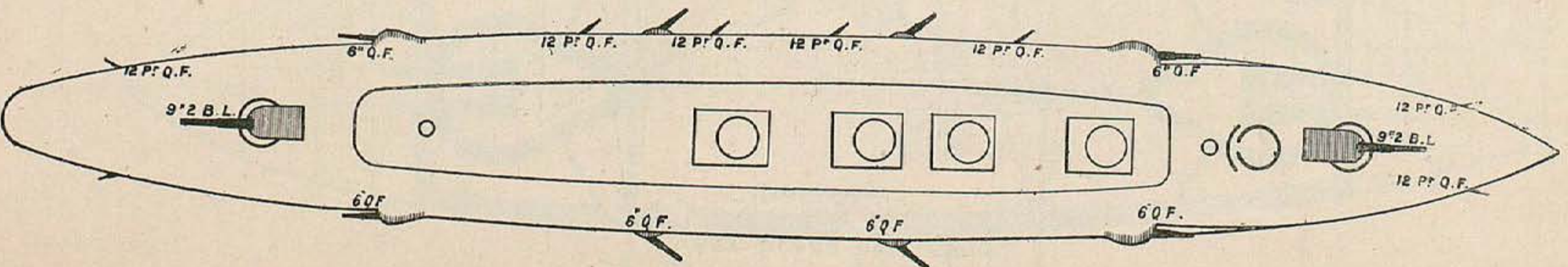
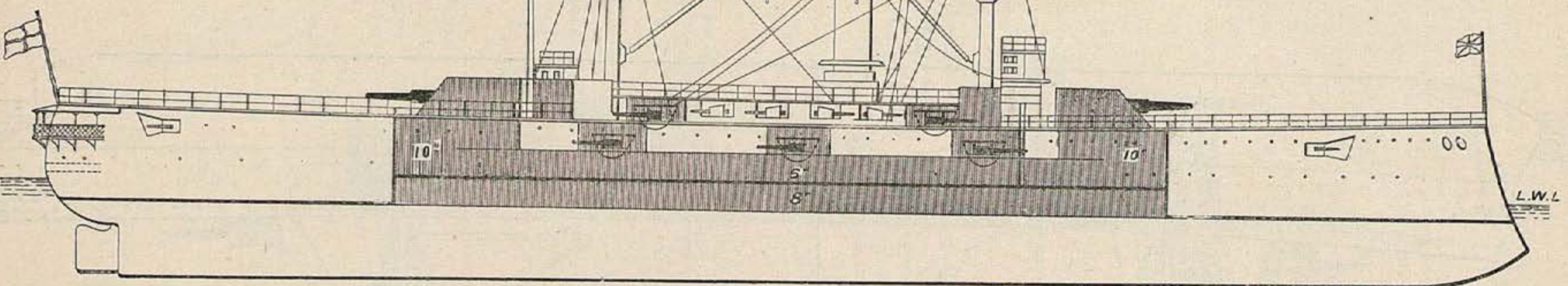


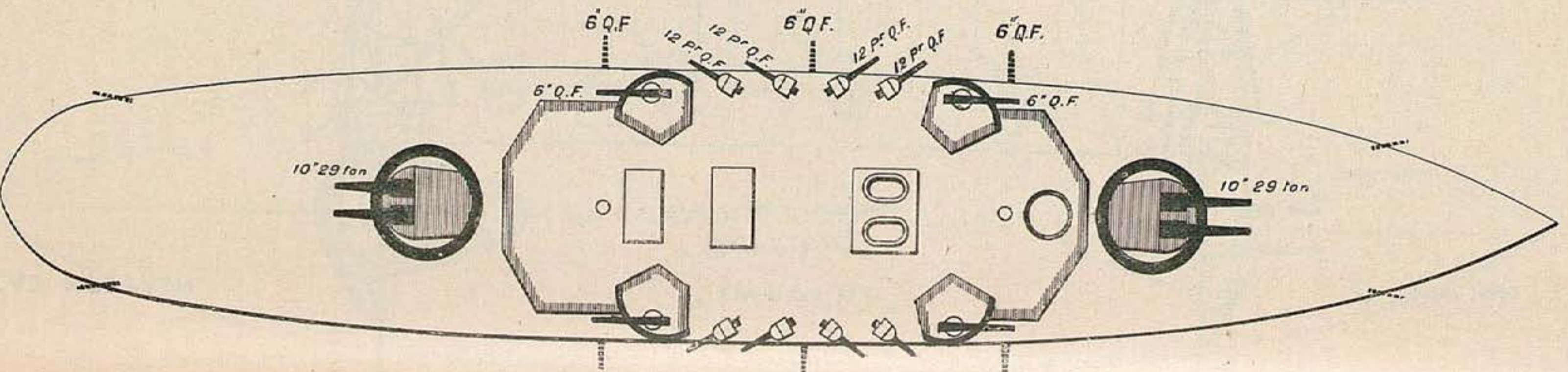
PLATE 19.

GREAT BRITAIN

FIRST CLASS BATTLESHIP

"Renown"





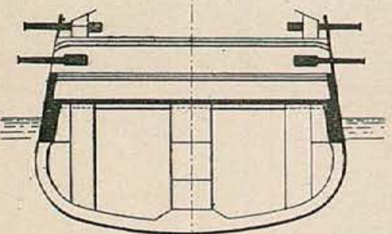
GREAT BRITAIN

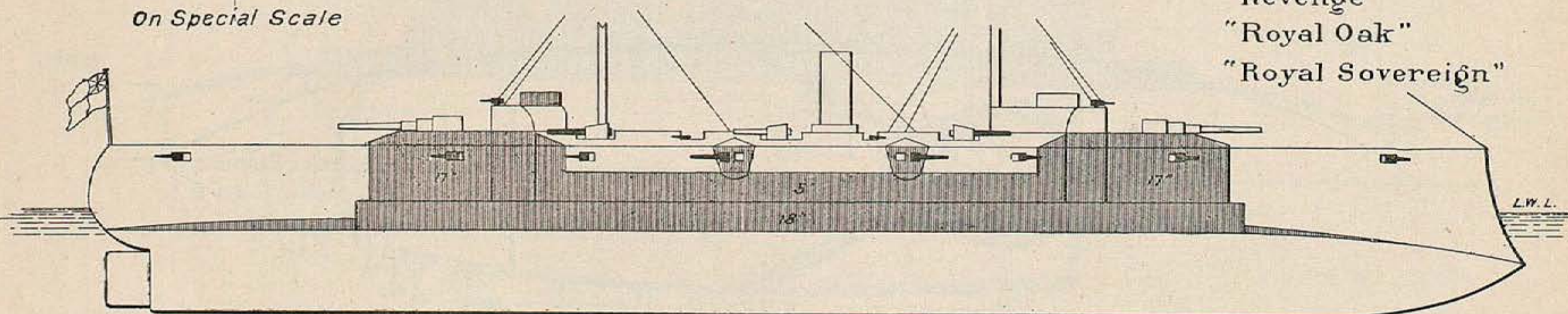
"Royal Sovereign"

of 14.150 tons displacement & 13.000. I.H. Power

"Royal Sovereign" Class

"Empress of India"
"Ramillies"
"Repulse"
"Resolution"
"Revenge"
"Royal Oak"
"Royal Sovereign"





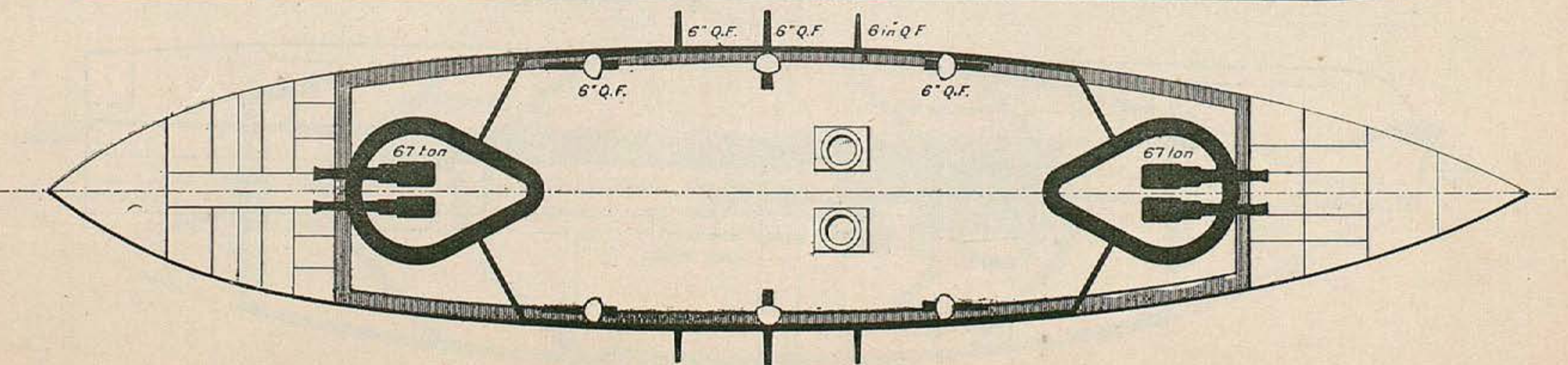
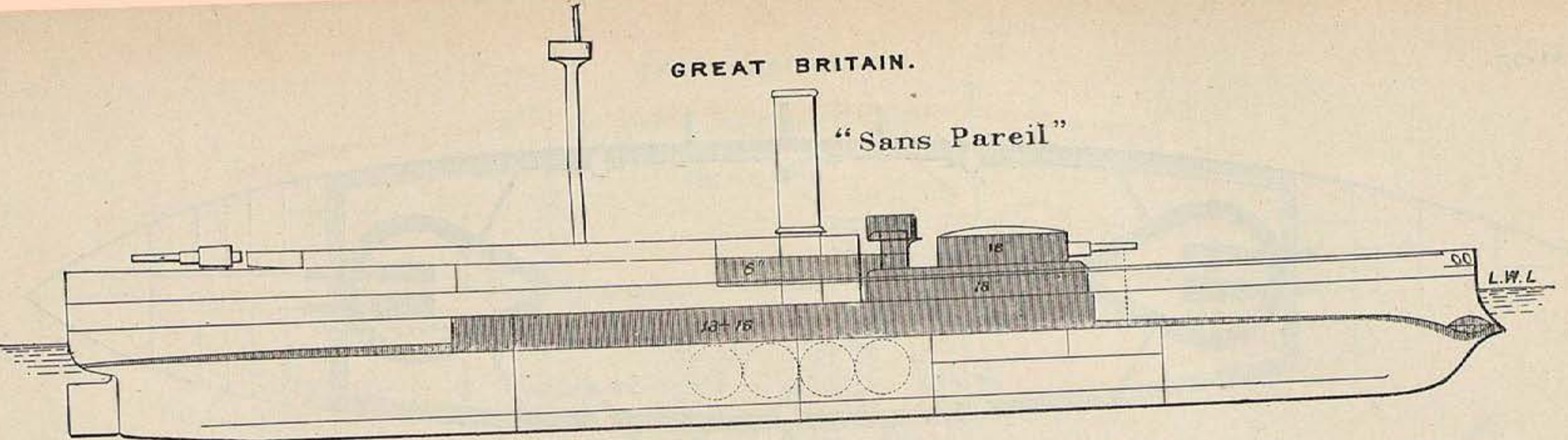
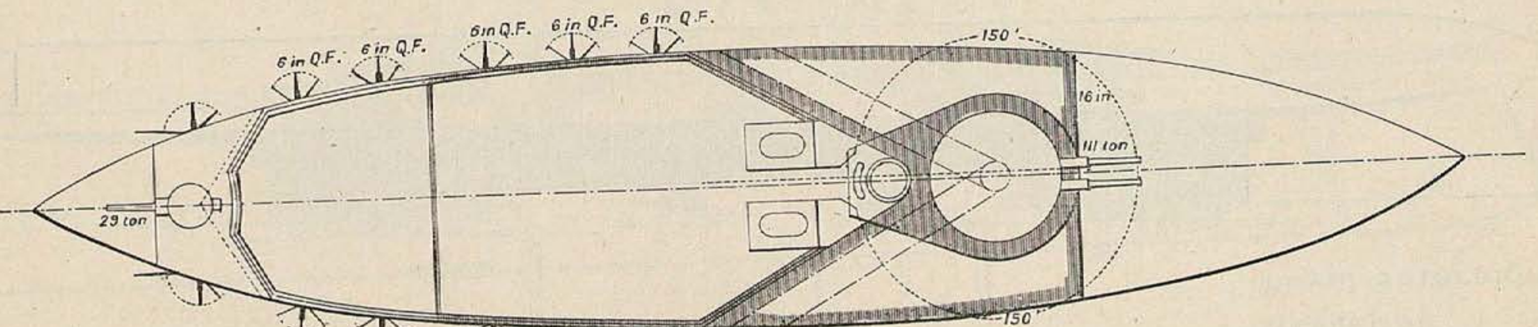


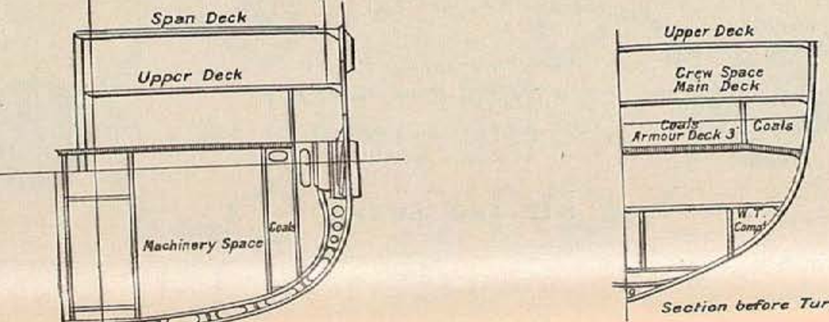
PLATE 21.

GREAT BRITAIN.

"Sans Pareil"

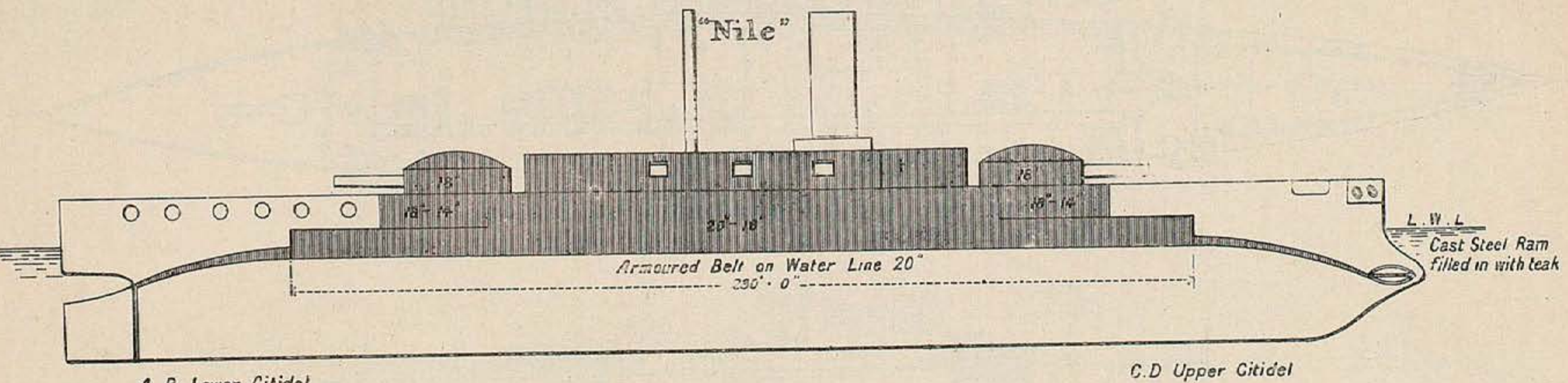






Section before Turret

"Trafalgar"
"Nile"



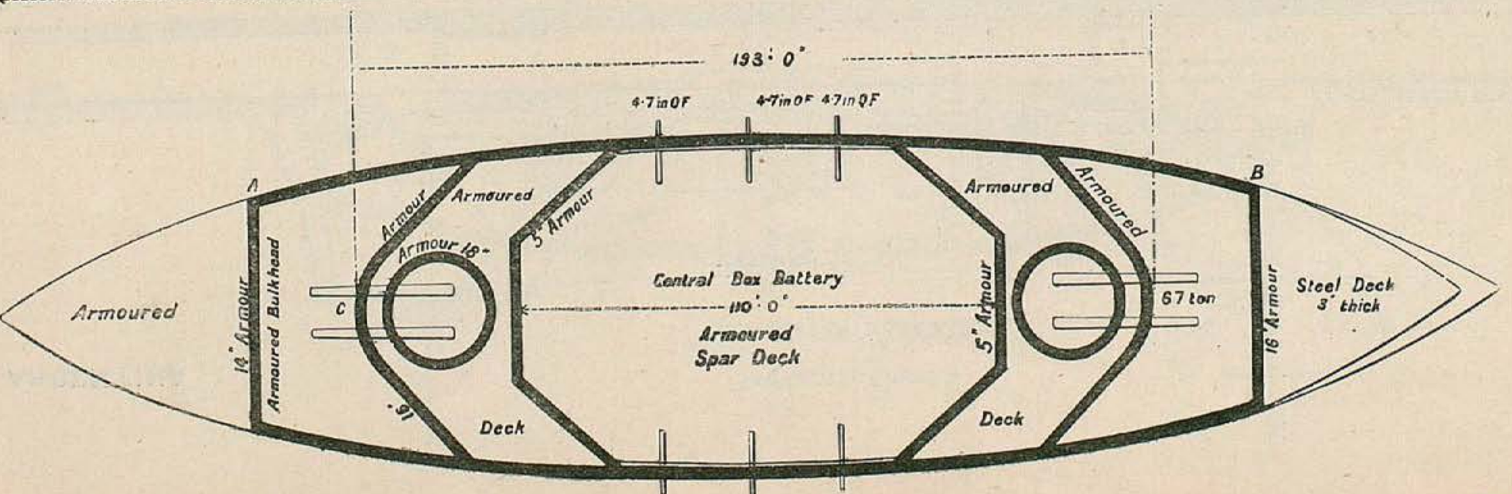


PLATE 23.

ARGENTINA

PROTECTED CRUISER

"Buenos Aires."

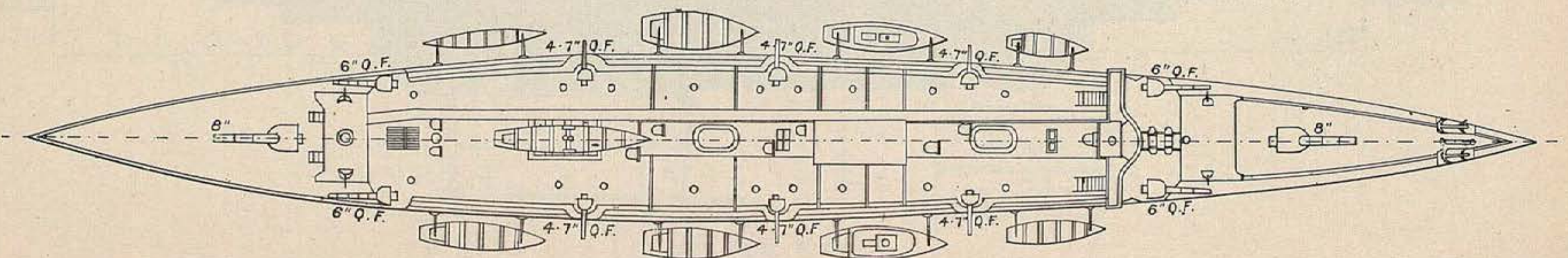


PLATE 24.

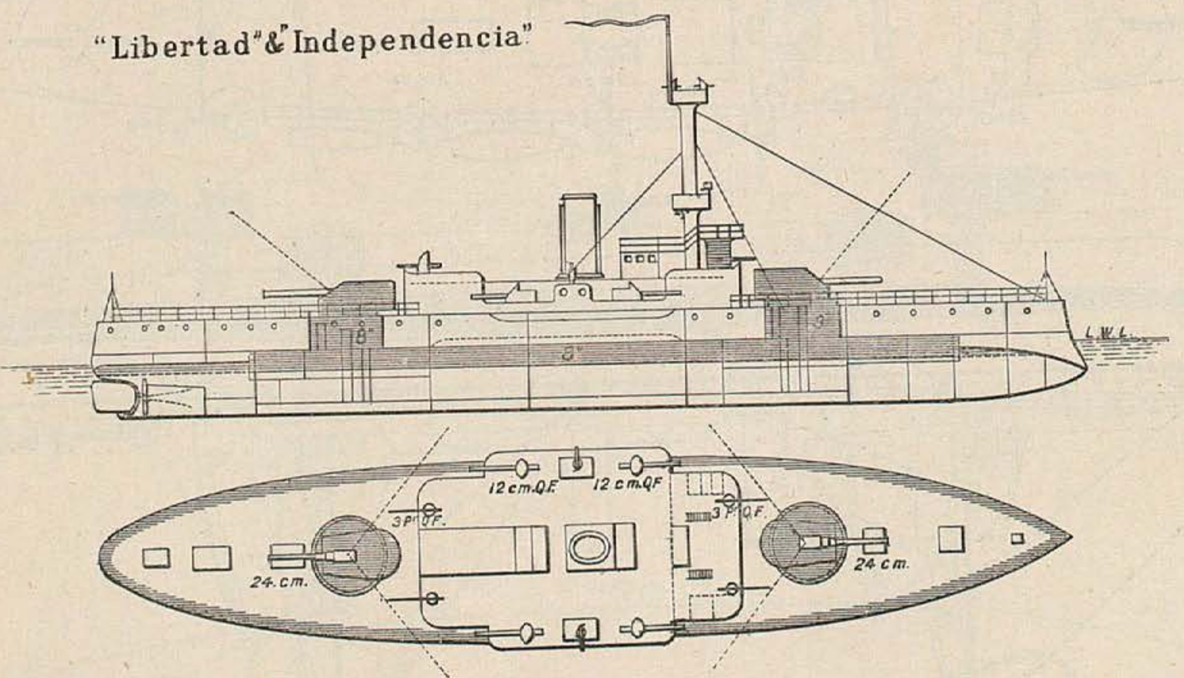


PLATE 25.

"Nueve de Julio."

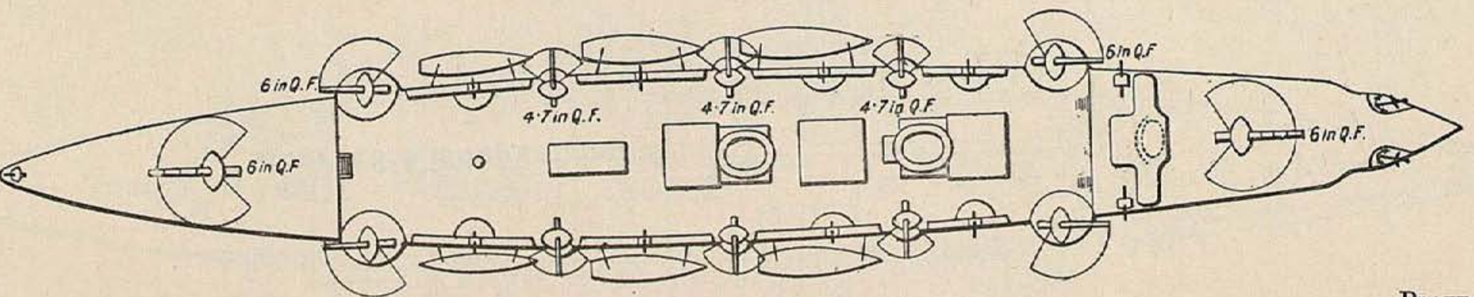


PLATE 26.

AUSTRIA HUNGARY.

"Kaiser Franz Joseph."

"Kaiserin Elizabeth"

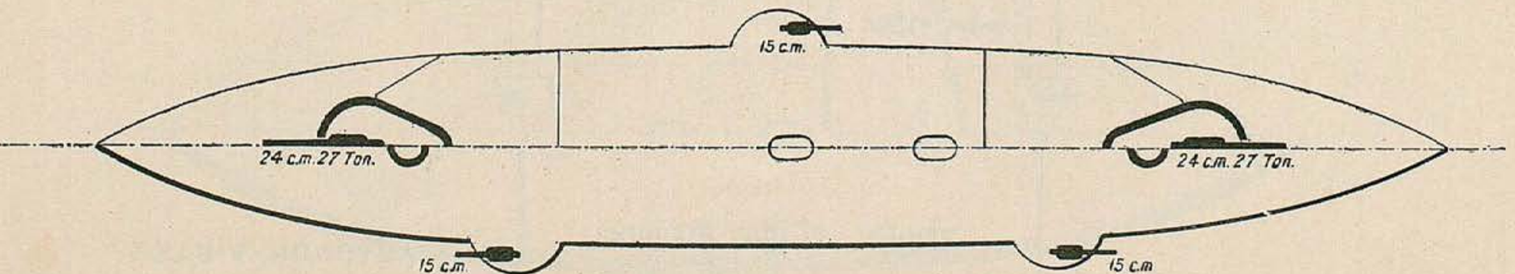


PLATE 27.

AUSTRIA-HUNGARY.

"Kaiserin Maria Teresa"

L.W.L.

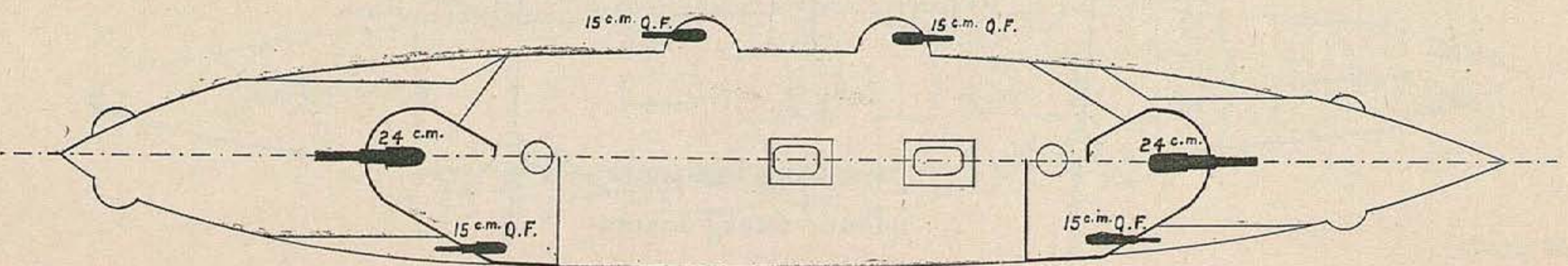
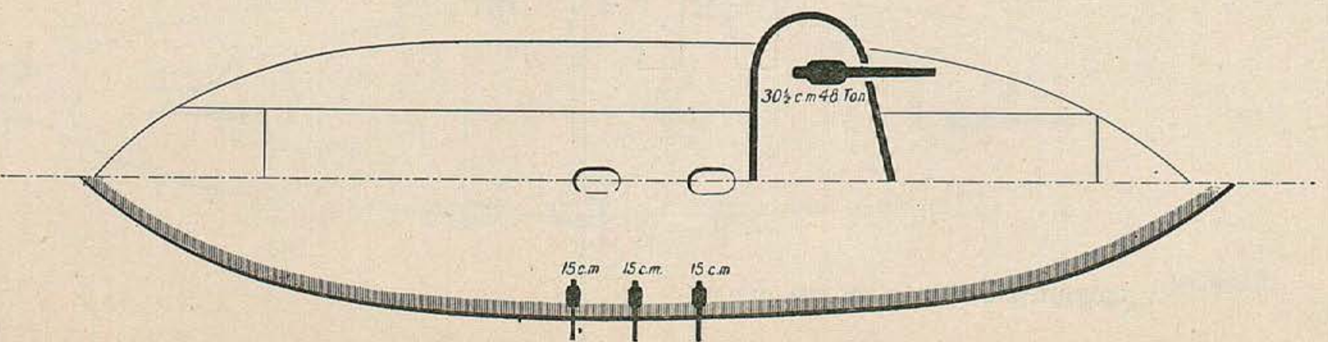


PLATE 28.

AUSTRIA-HUNGARY.

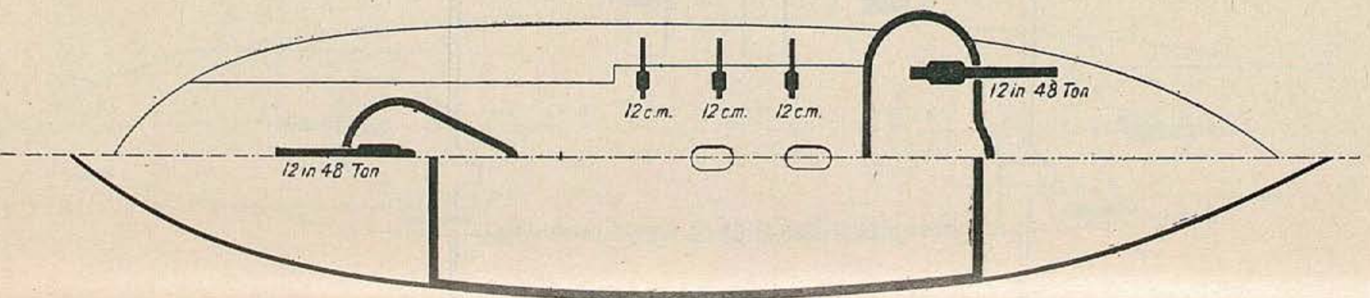
"Kronprinzessin Erzherzogin Stefanie."

L.W.L.



AUSTRIA HUNGARY.

"Kronprinz Erzherzog Rudolph"



AUSTRIA-HUNGARY.

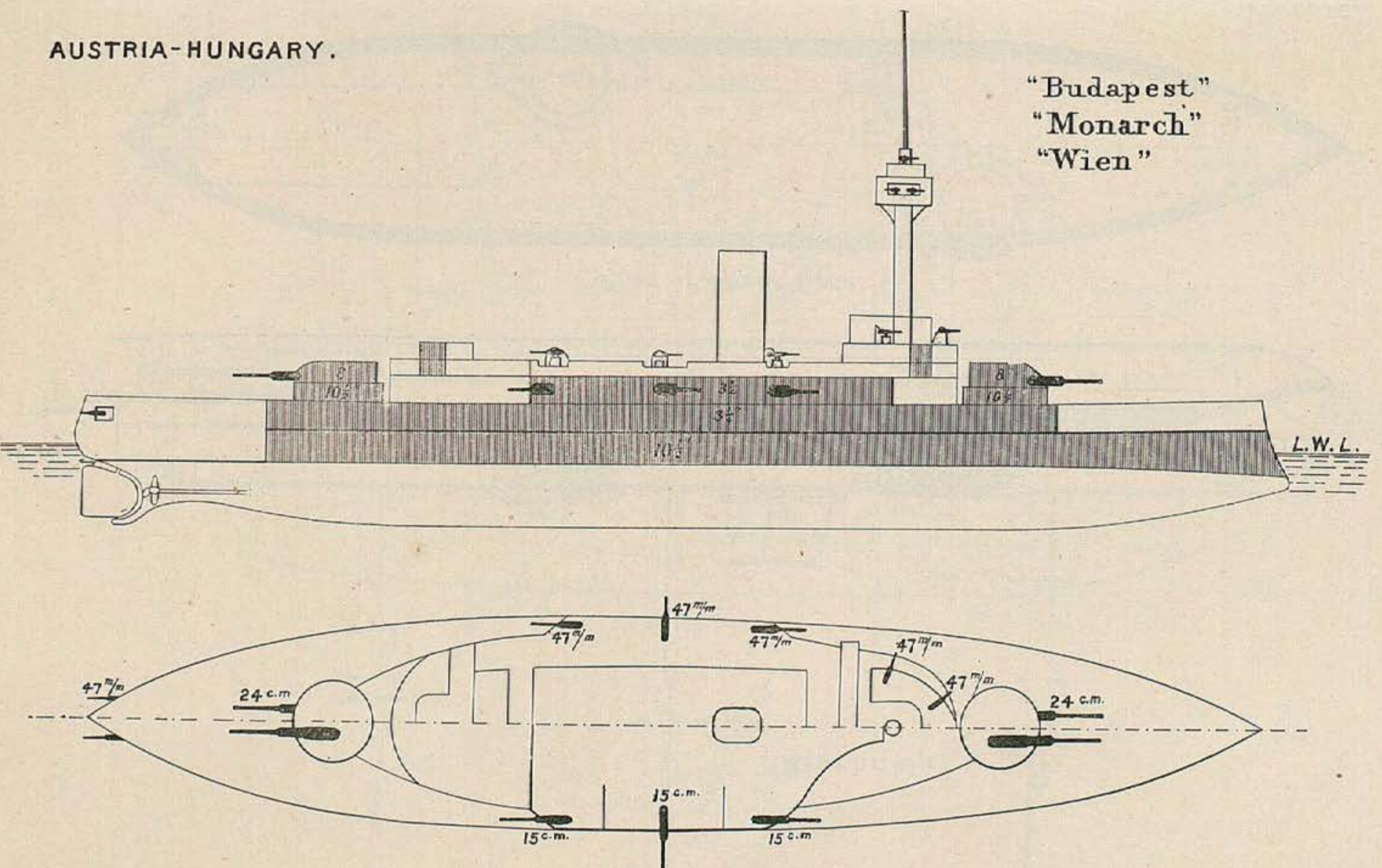


PLATE 31.

BRAZIL.

"Riachuelo"

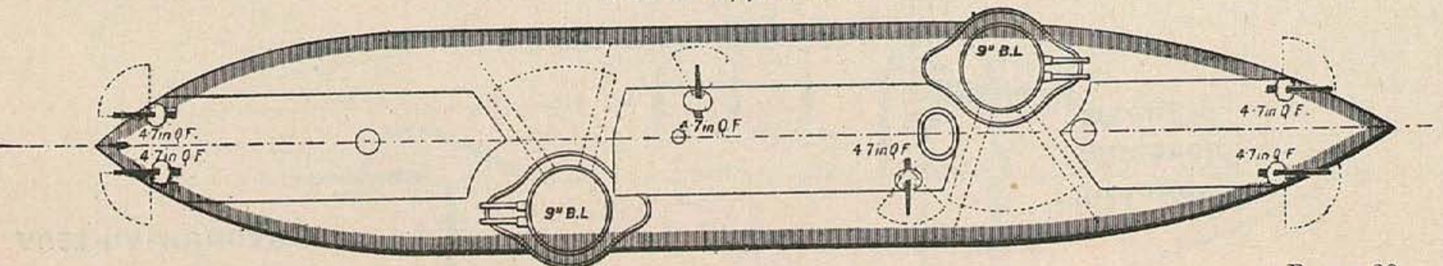
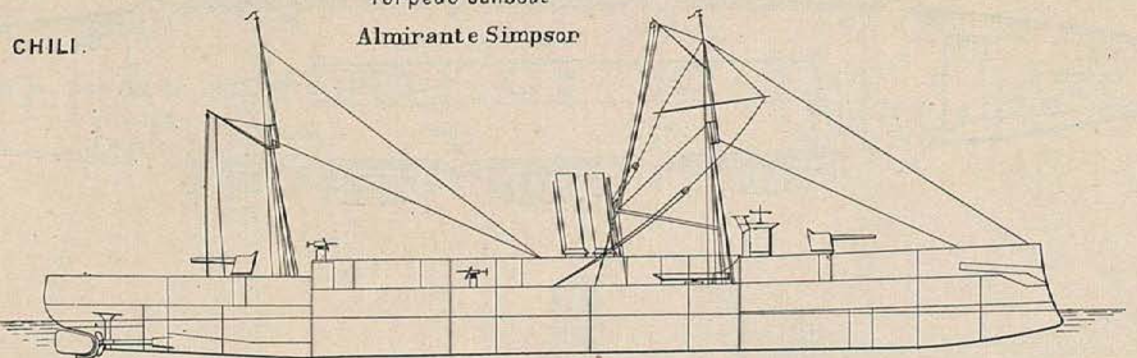


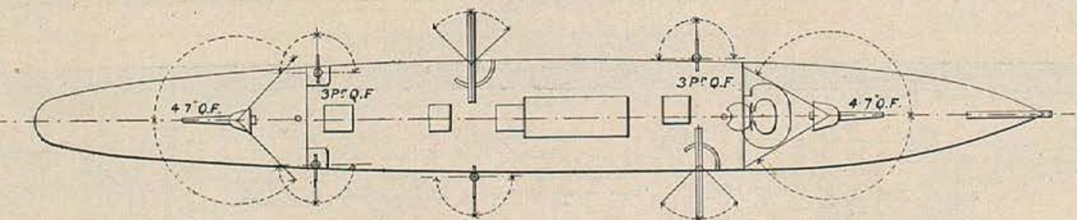
PLATE 32.

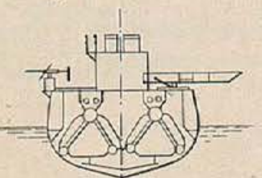
CHILI.

Torpedo Gunboat

Almirante Simpson







Section at Boilers

PLATE 33.

CHILI.

"Blanco Encalada"

L.W.L.

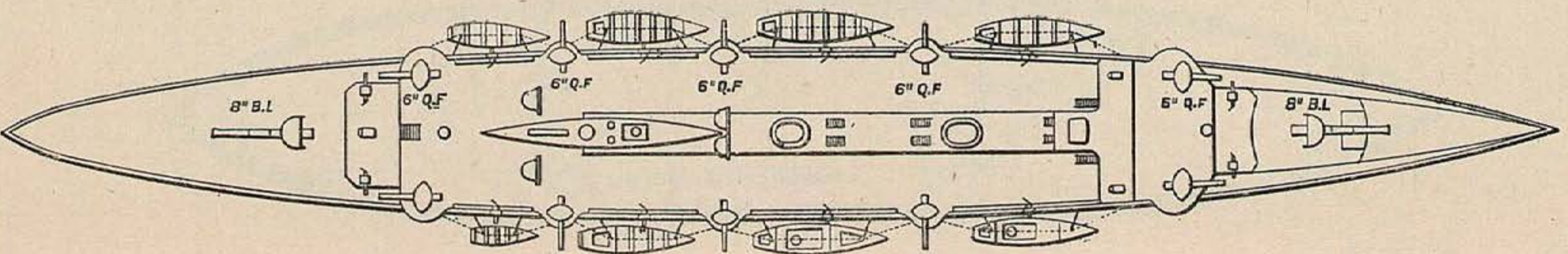


PLATE 34.

CHILI

"Capitan Prat"

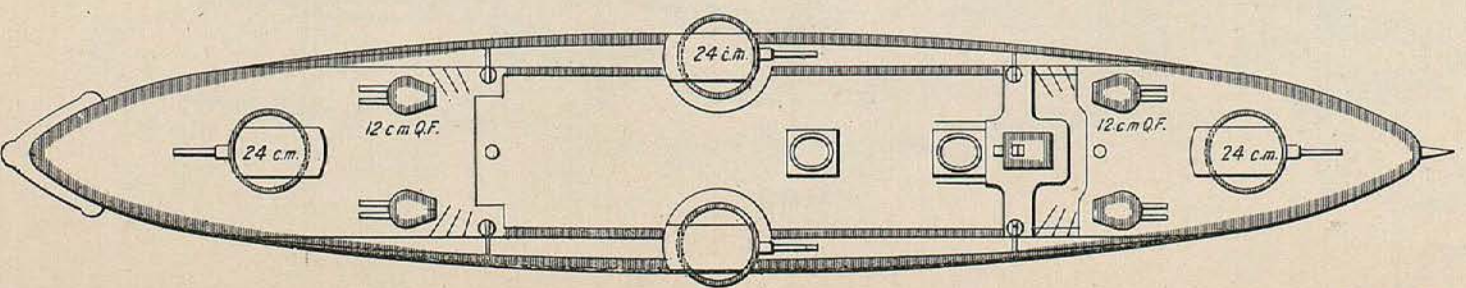
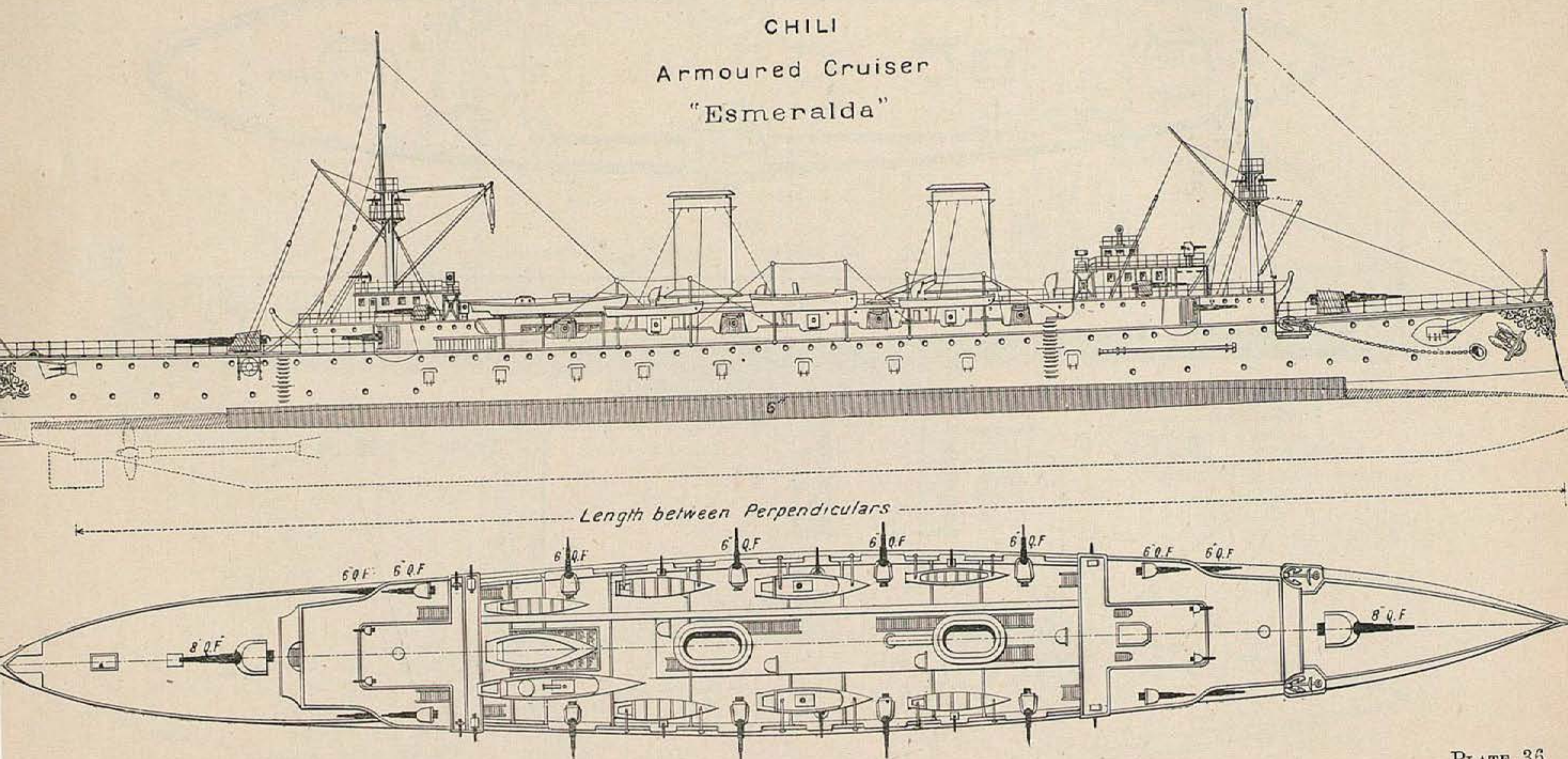


PLATE 35.


CHILI
Armoured Cruiser
"Esmeralda"
6"
Length between Perpendiculars
8" Q.F
6" Q.F
6" Q.F
6" Q.F
6" Q.F
6" Q.F
6" Q.F
6" Q.F
6" Q.F
8" Q.F

CHILI
Protected Cruiser
"Ministro Zenteno"

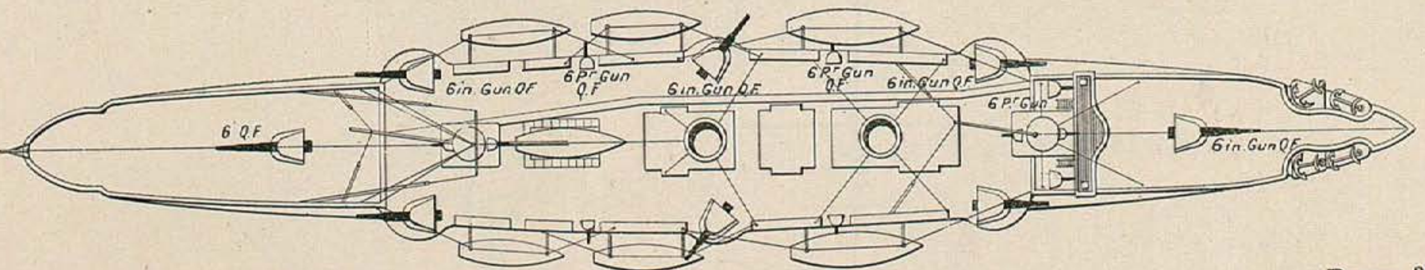
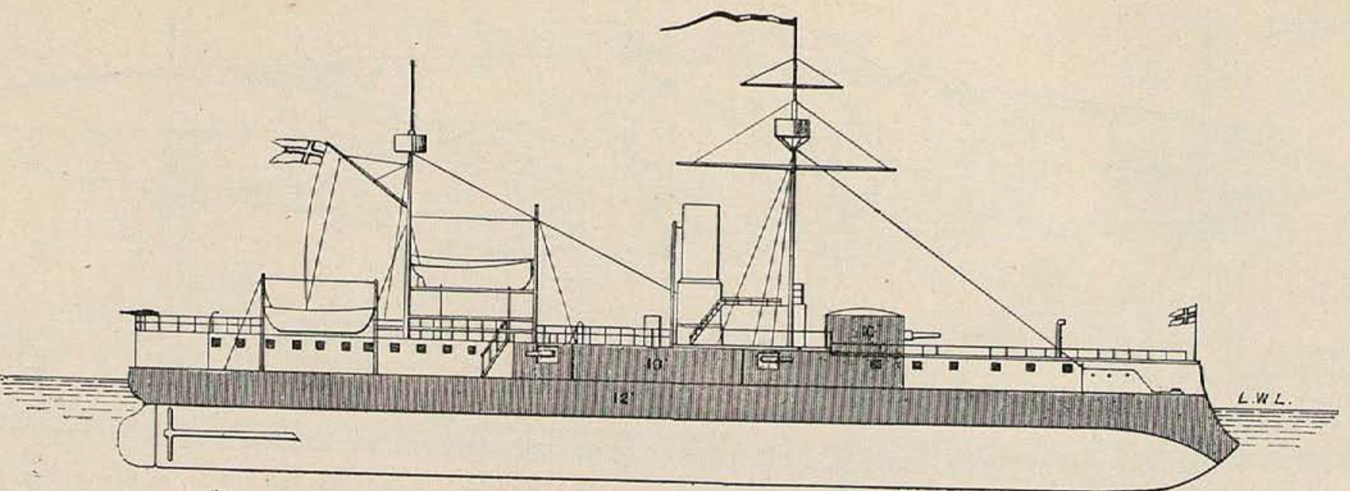
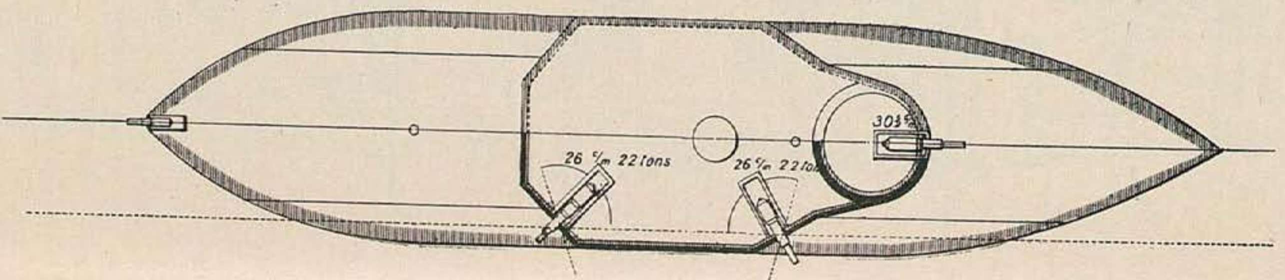


PLATE 37.

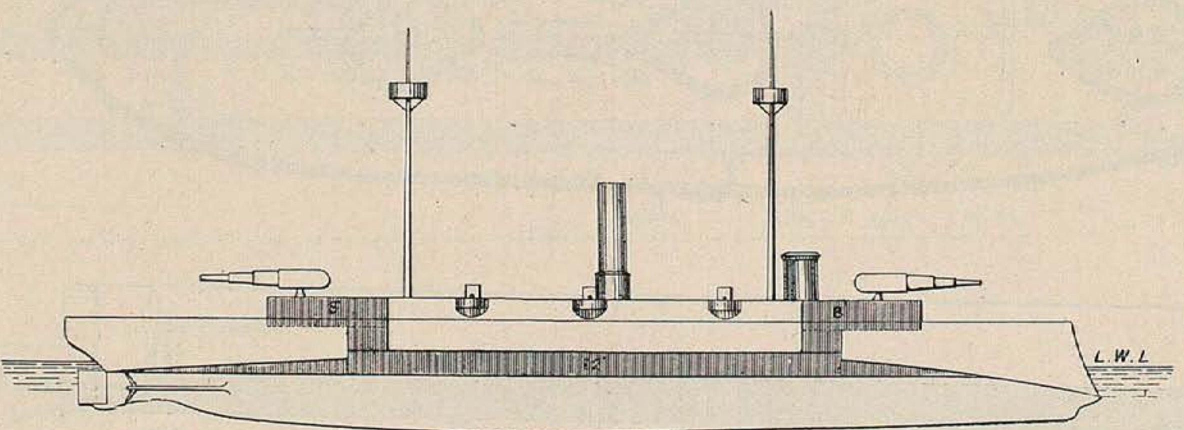
"Helgoland"





DENMARK

"Iver Hvitfeld"



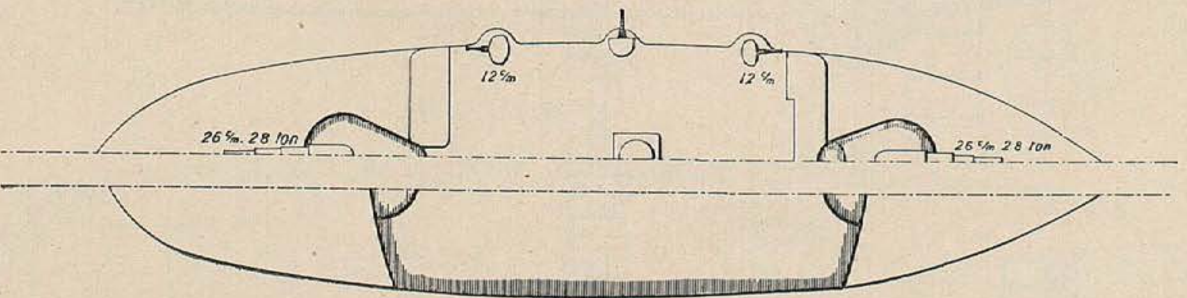
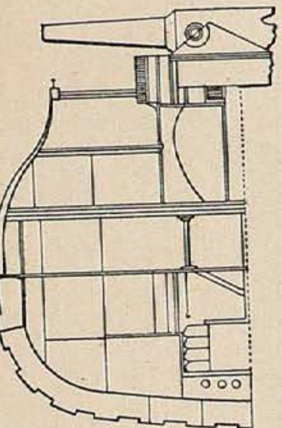
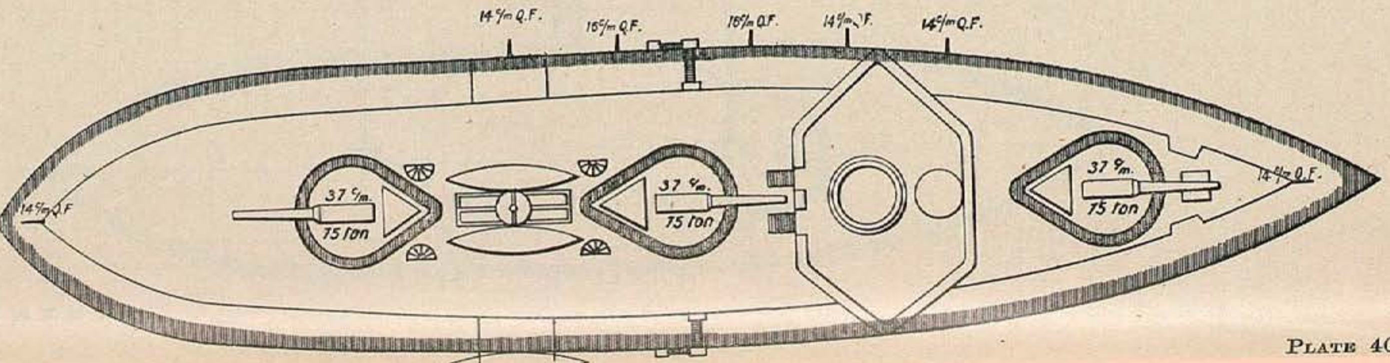


PLATE 39.

FRANCE.

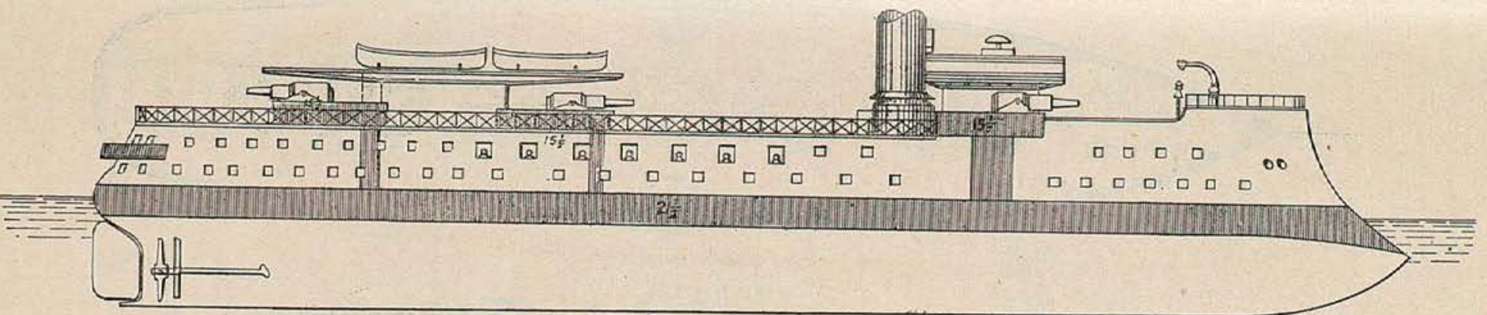
"Amiral Baudin." "Formidable"



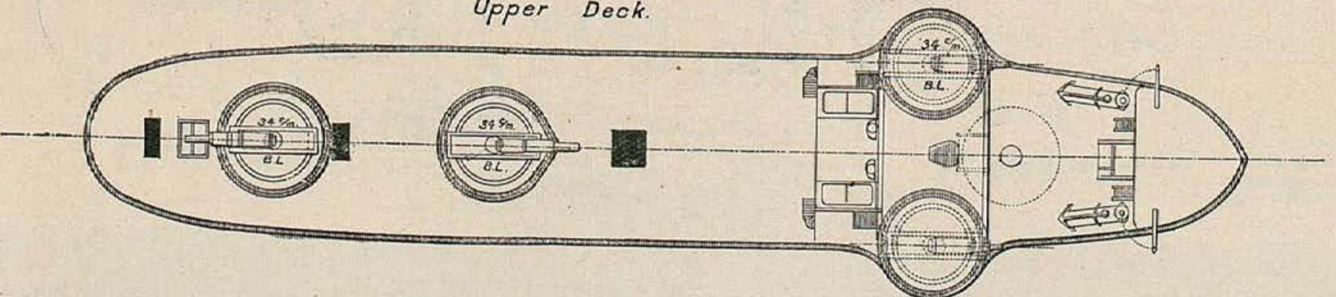


The 37 c/m gun amidships in these ships has been removed and four 6" 29 Q.F fitted in Casemates on the upper deck instead.

FRANCE. "Amiral Duperré"



Upper Deck.



Main Deck.

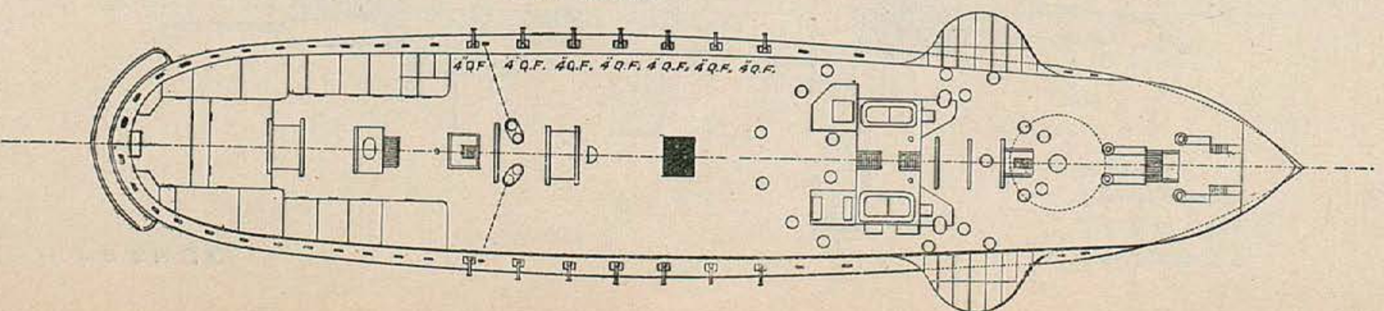
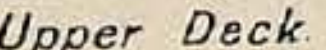


PLATE 41.

FRANCE.

(a) "Bouvines"
"Jémmapes"
(a) "Trehouart"
"Valmy"

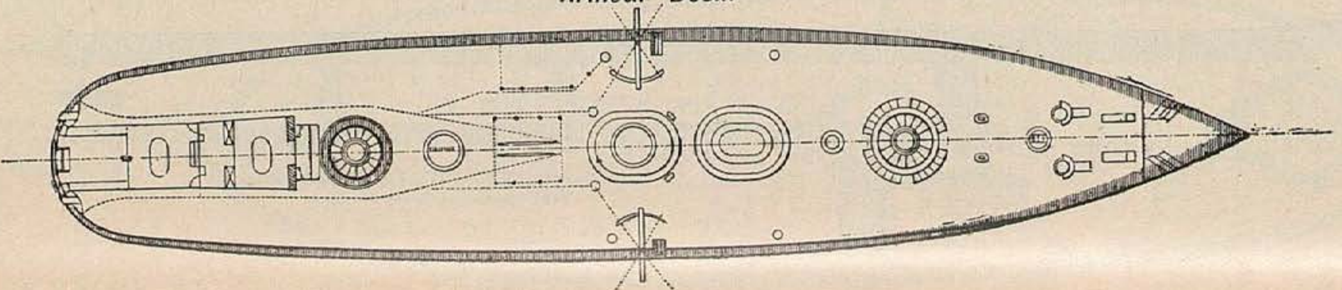
L.W.L.
14½"
12½"
17½"-10"
14½"
12½"



10% Q.F.
10% Q.I.
34%m. B.L.
34%m. B.L.

(a) the upper decks of these ships have been raised forward to make them more seaworthy The other two are as sketch.





FRANCE.

"Brennus"
Battle Ship.

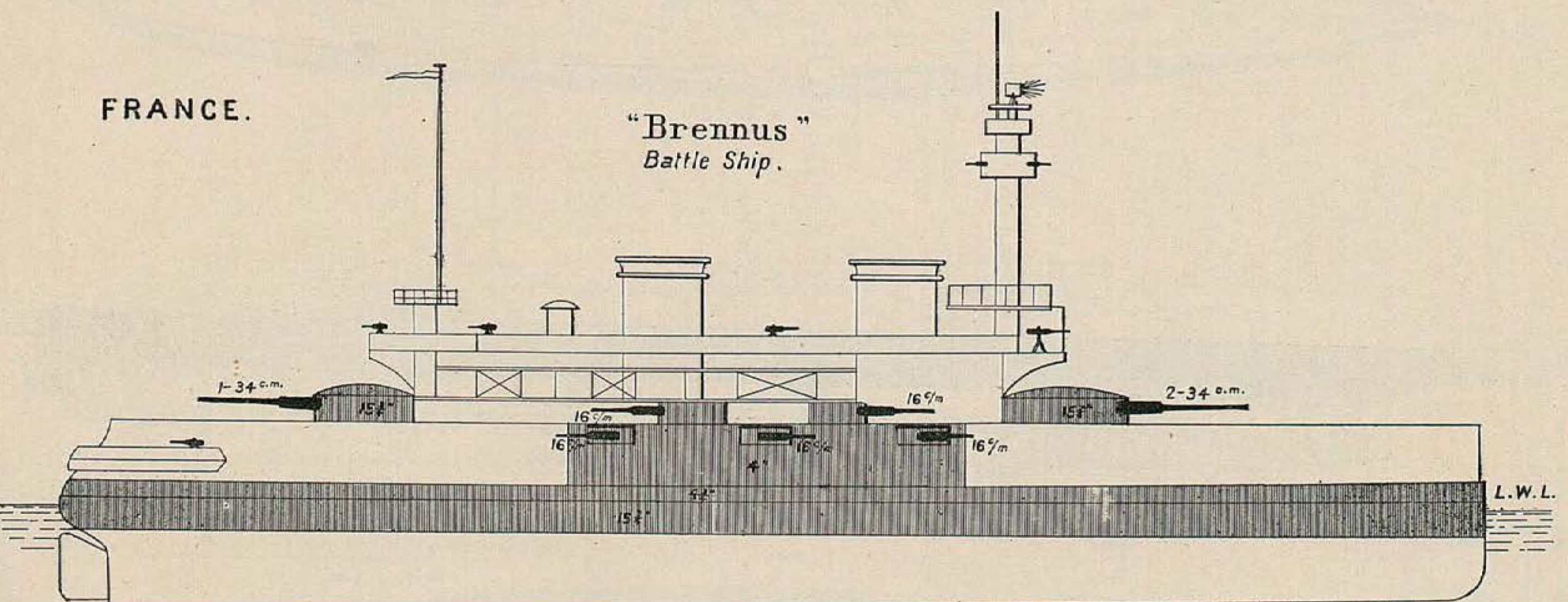


PLATE 43.

FRANCE.

"Bruix" *class* { "Bruix", "Chanzy", "Charner", "Latouche Tréville" }

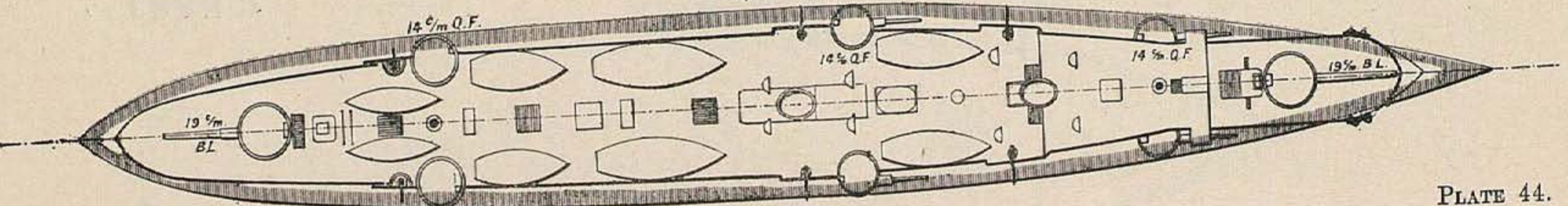
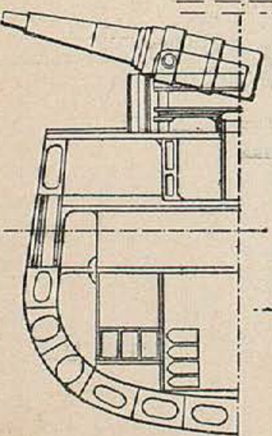


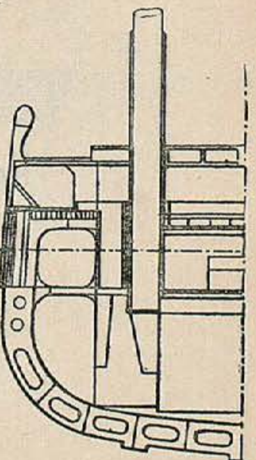
PLATE 44.

FRANCE

"Caiman"
"Indomptable"
"Requin"
"Terrible"

L. W. L.





Note. The Requin is in hand for refit. The 42 c/m guns are to be replaced by two 35 c/m guns.
The other ships are to be dealt with later.

42 c/m B.L.

10 c/m Q.F.

10 c/m Q.F.

17 c/m

42 c/m B.L.

Plate 45.

FRANCE.

"Carnot"

4''
17¼'' – 10''
L.W.L.

Note *To reduce weight the after Military Mast has been taken out and the bridges cut down*

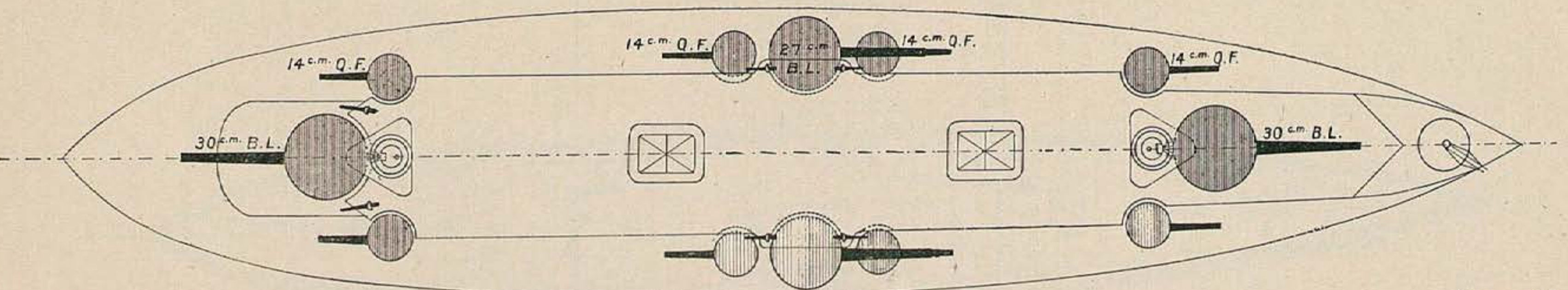


Plate 46.

FRANCE

"Charlemagne"
"St Louis"
"Gaulois"

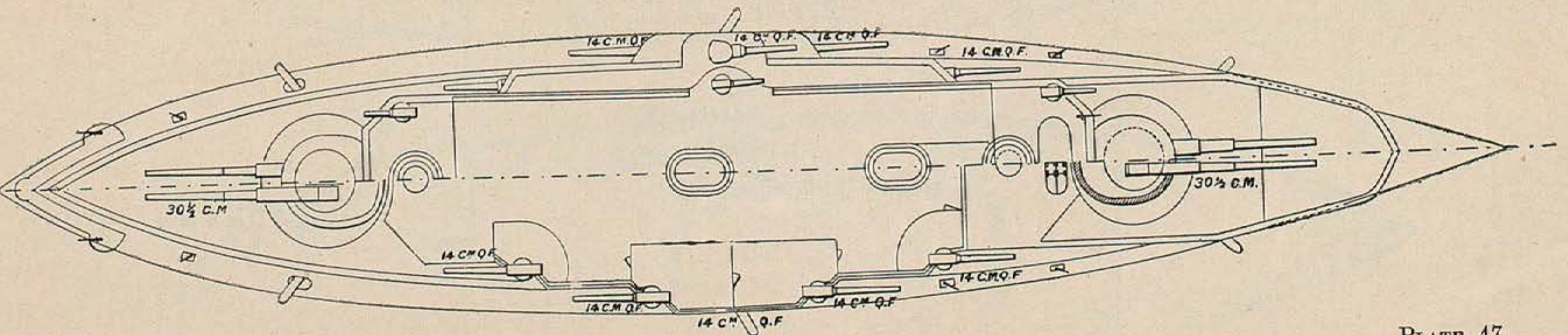
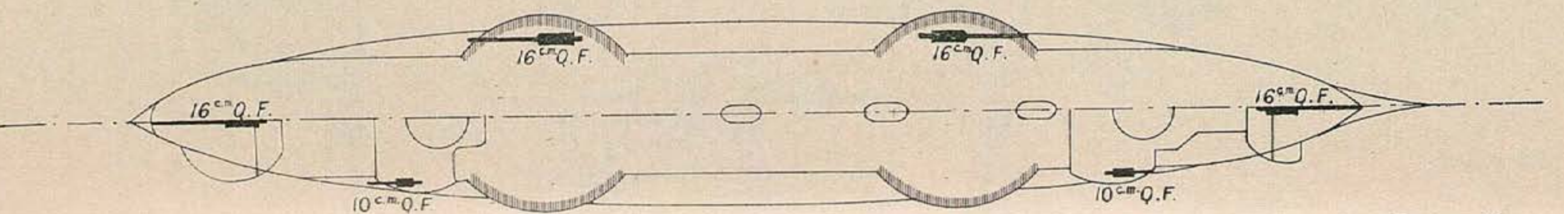


PLATE 47.

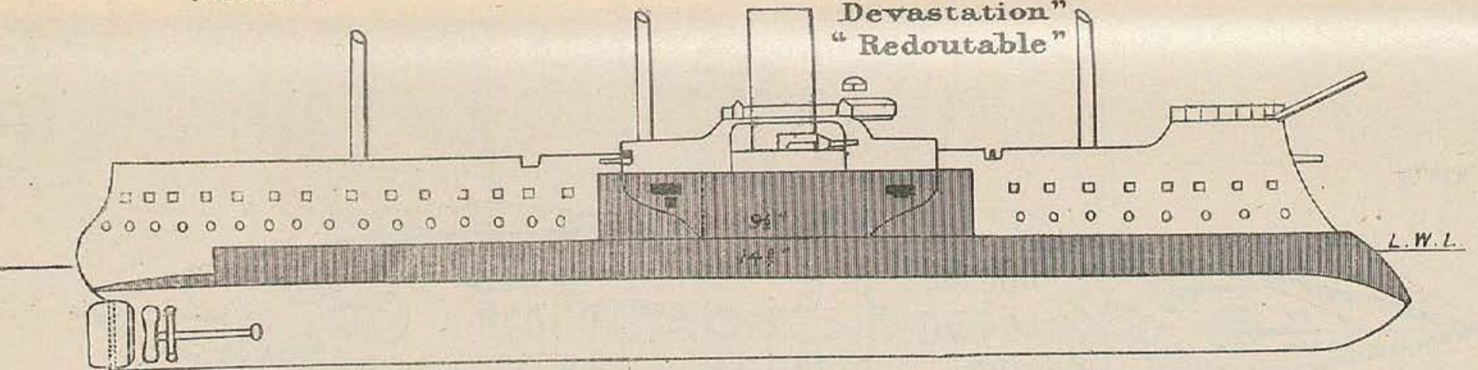
FRANCE

"Chasseloup Laubat."
"Bugeaud."
"Friant."

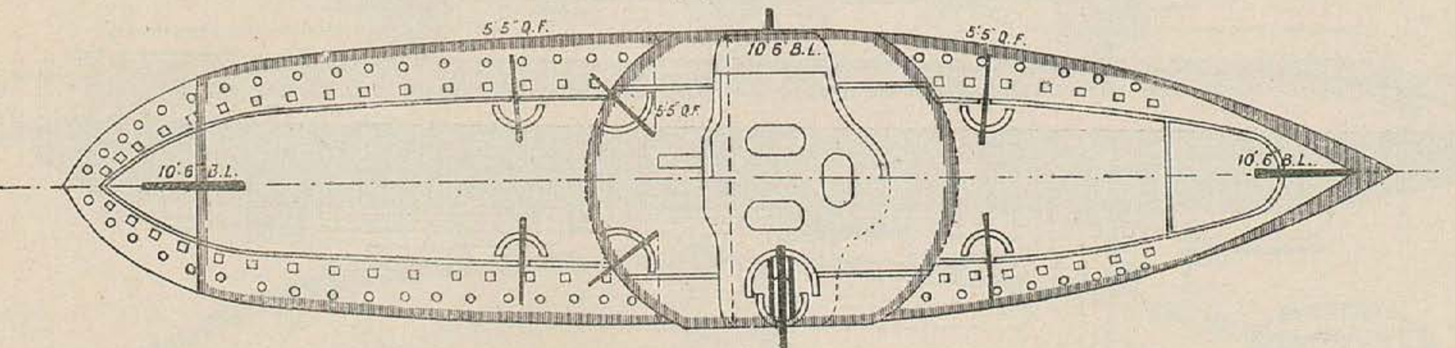


FRANCE

Devastation”
“Redoutable”



Upper Deck



Main Deck

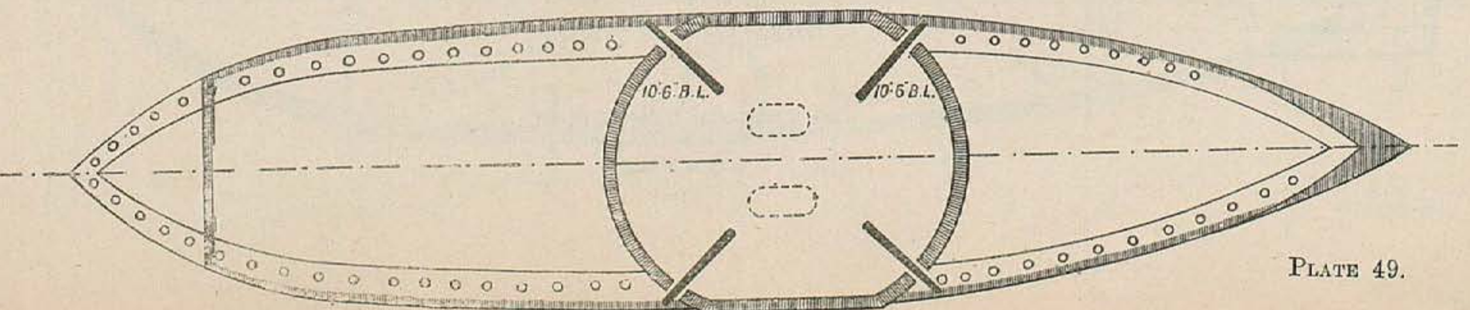


PLATE 49.

FRANCE

ARMOURED CRUISERS

"Dupuy-de-Lôme"

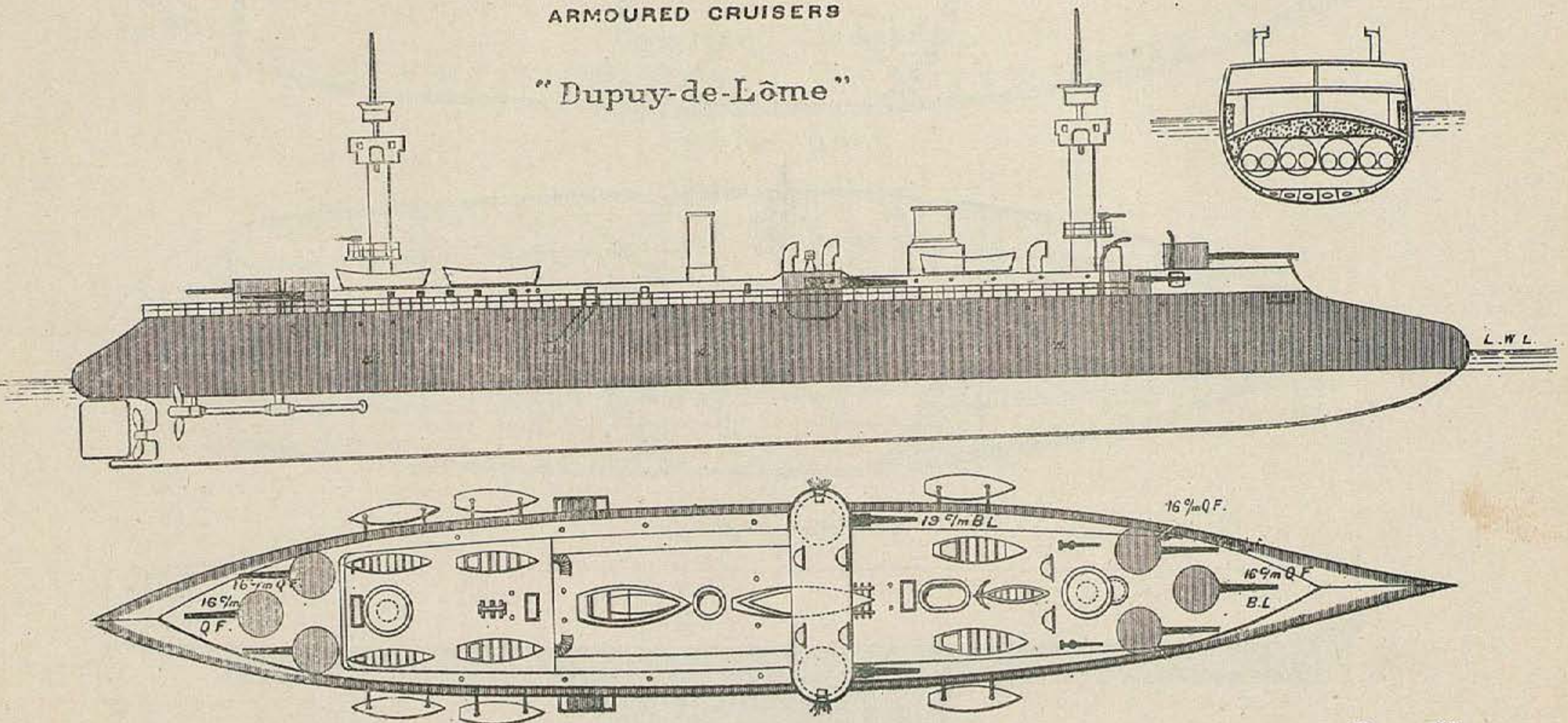


PLATE 50.

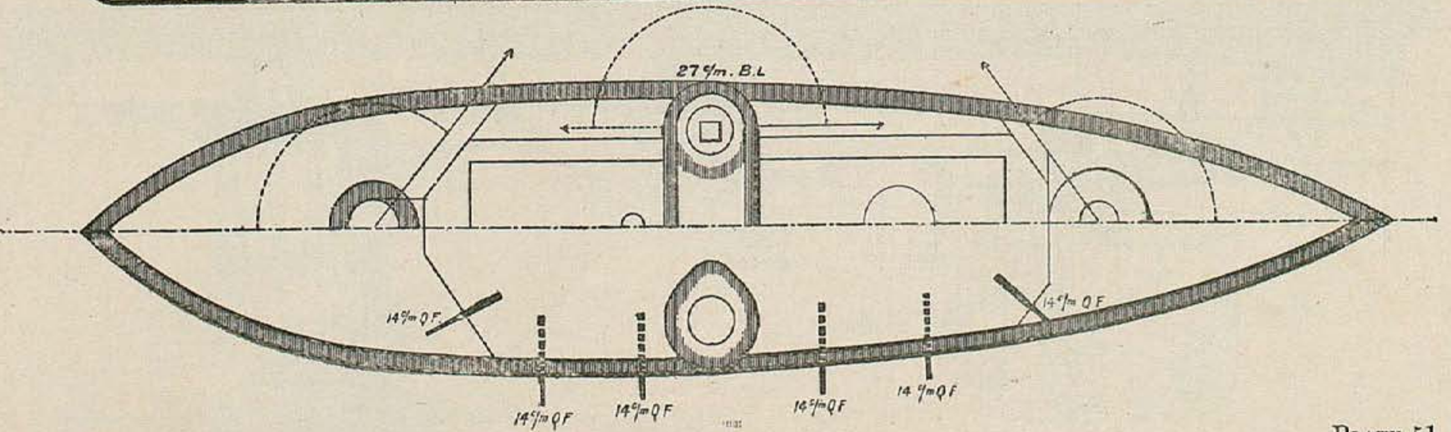

FRANCE
"Hoche"
34 c/m B.L.
34 c/m B.L
15"
18"
27 c/m. B.L
14 c/m Q.F.
14 c/m Q F
14 c/m Q F
14 c/m Q F
14 c/m Q F
14 c/m Q F

PLATE 51.

"Jauréguiberry."

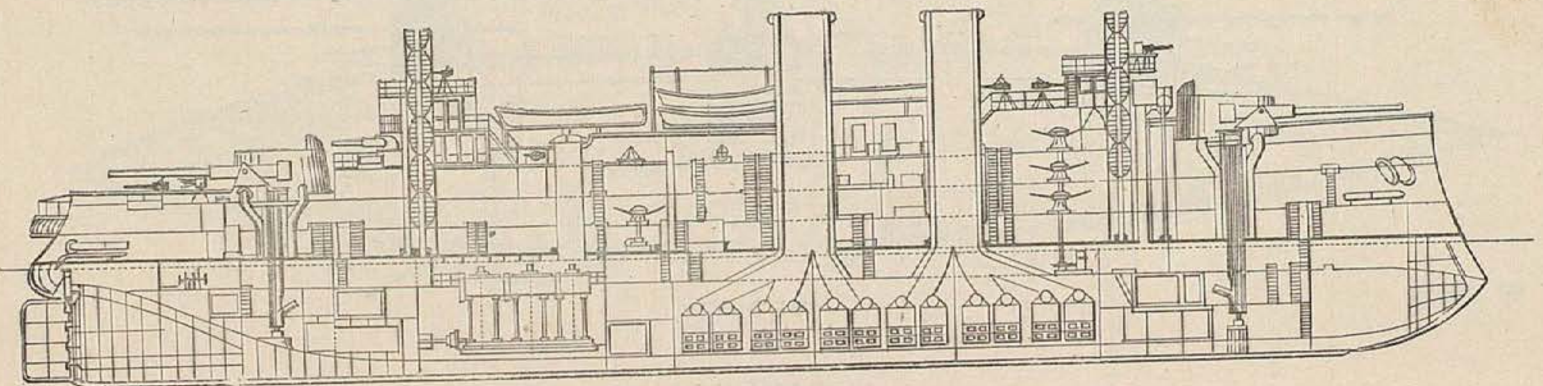
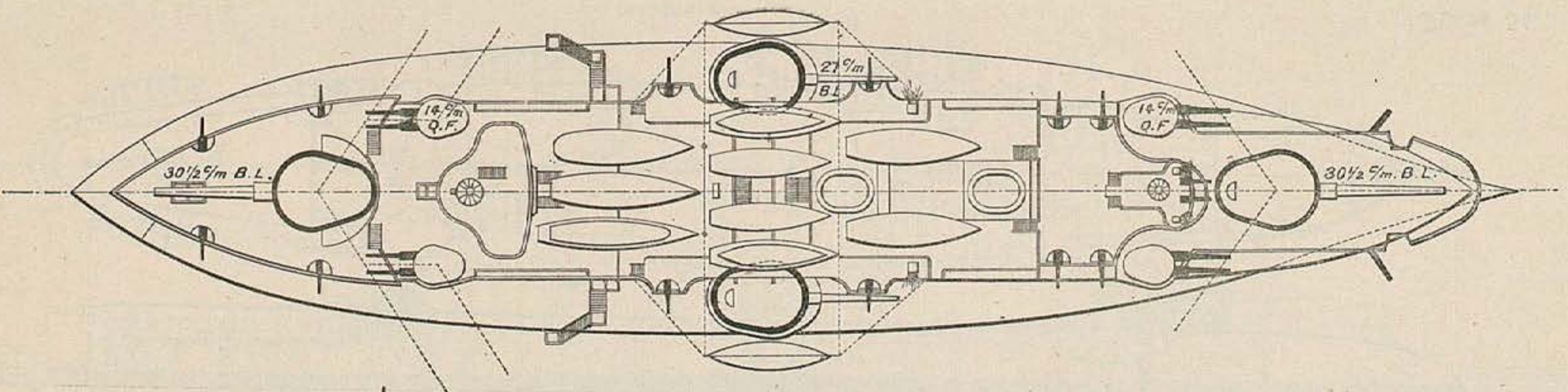
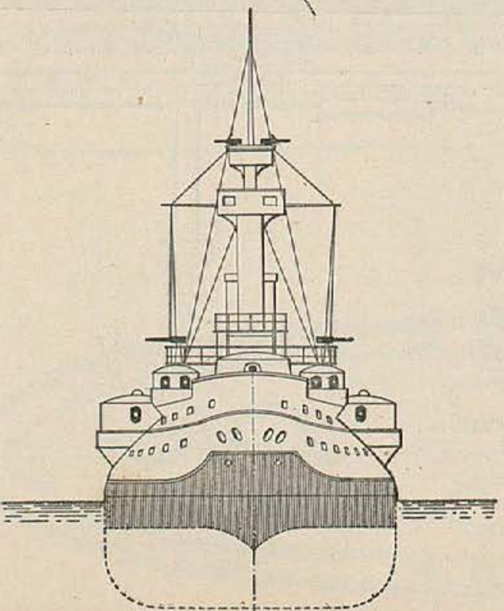


PLATE 52.

FRANCE

"Jauréguiberry."





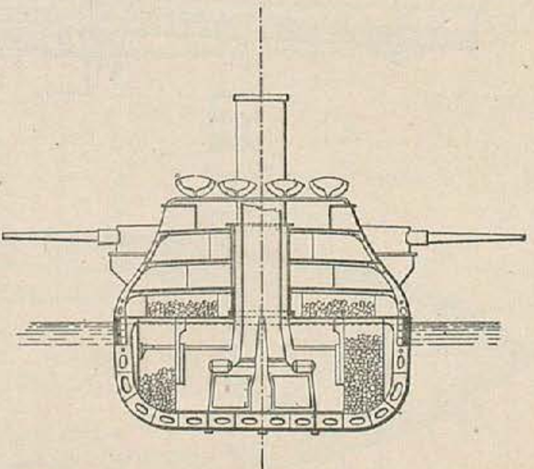


PLATE 53.

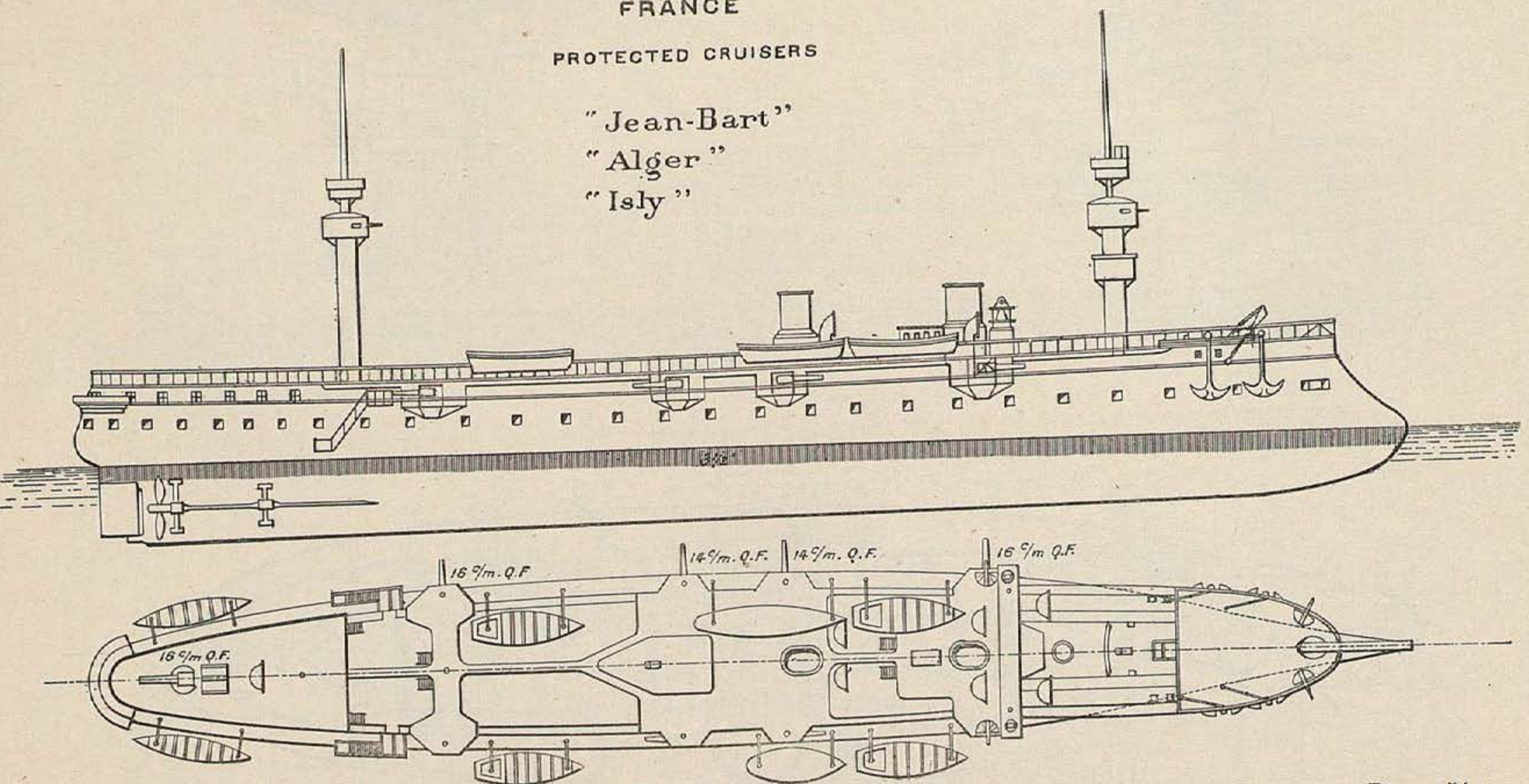

FRANCE
PROTECTED CRUISERS
"Jean-Bart"
"Alger"
"Isly"
16 c/m. Q.F
14 c/m. Q.F.
14 c/m. Q.F.
16 c/m Q.F.
16 c/m Q.F.

PLATE 54.

FRANCE

"Magenta"
"Marceau"
"Neptune"

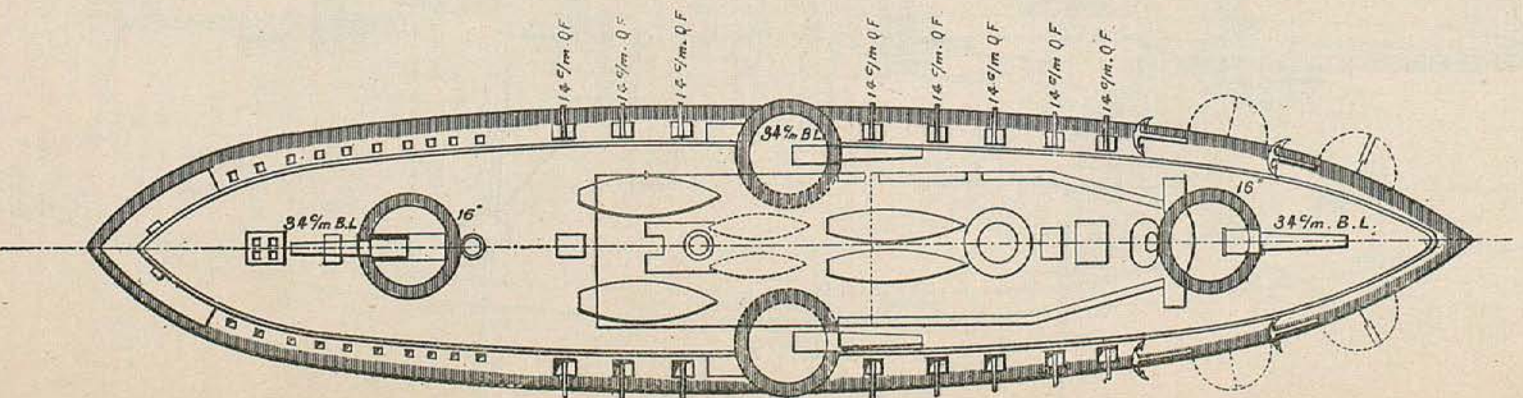


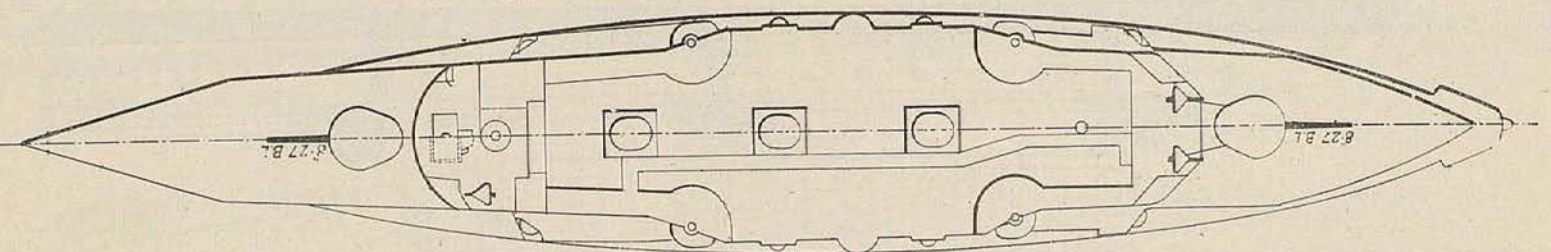
PLATE 55.

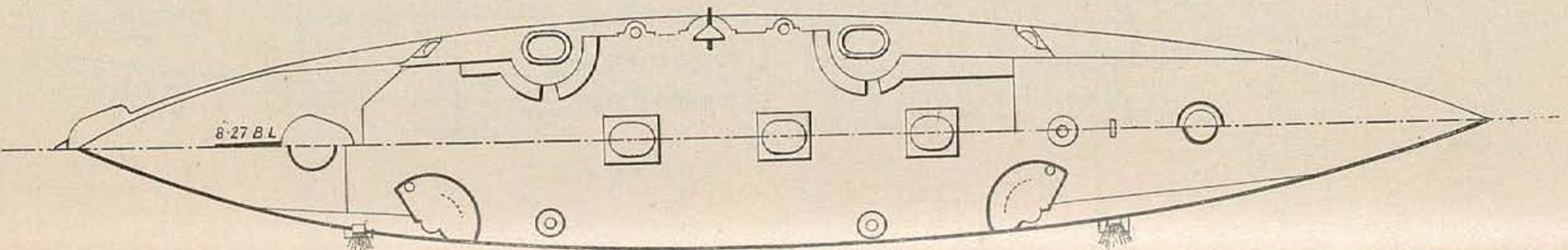
Germany.

"ERSATZ FREYA"

K, L, M, N.

8·27 B.L
5·9 Q.F
5·9 Q.F
5·9 Q.F
5·9 Q.F
8·27 B.L





"ERSATZ LEIPZIG"

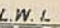


PLATE 57.

GERMANY.

Protected Cruiser
"Gefion"

L.W.L.

3"

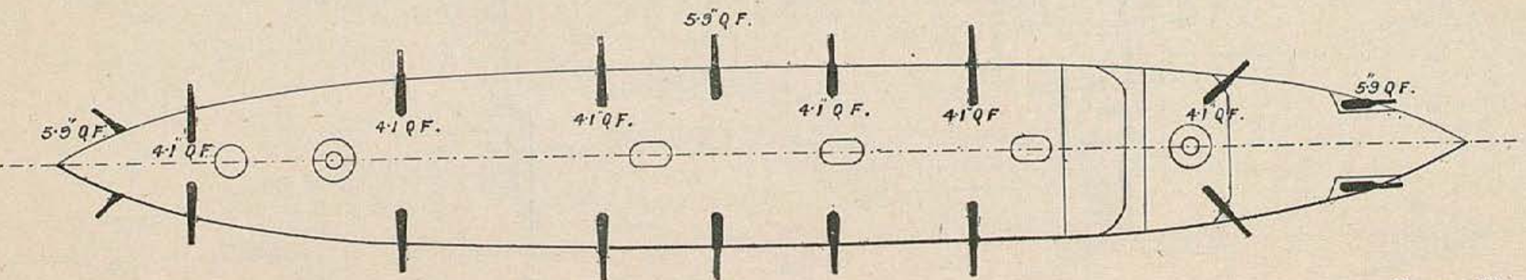


PLATE 58.

GERMANY.

"Kaiserin Augusta"

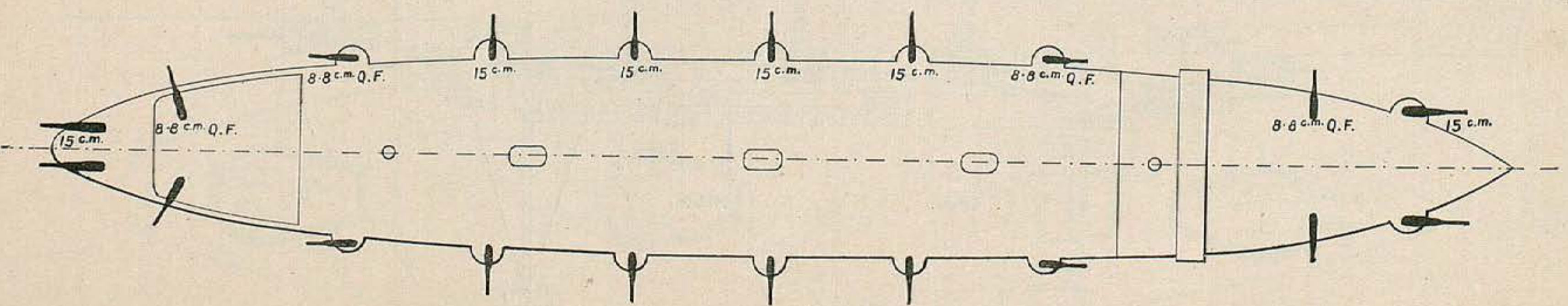


PLATE 59.

Germany.

"KAISER FRIEDRICH III."

L.W.L

9·45 B.L

2·5 Q.F

3·5 Q.F

3·5 Q.F

9·45 B.L

5·9 Q.F

9·45 B.L

PLATE 60.

GERMANY

"Kurfürst Friedrich Wilhelm"
"Brandenburg"
"Weissenburg"
"Woerth"

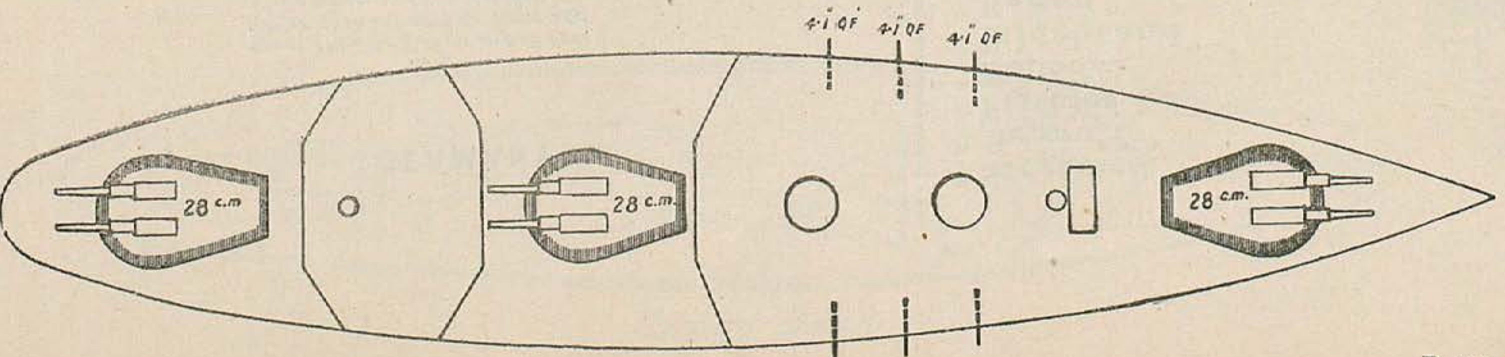


PLATE 61.

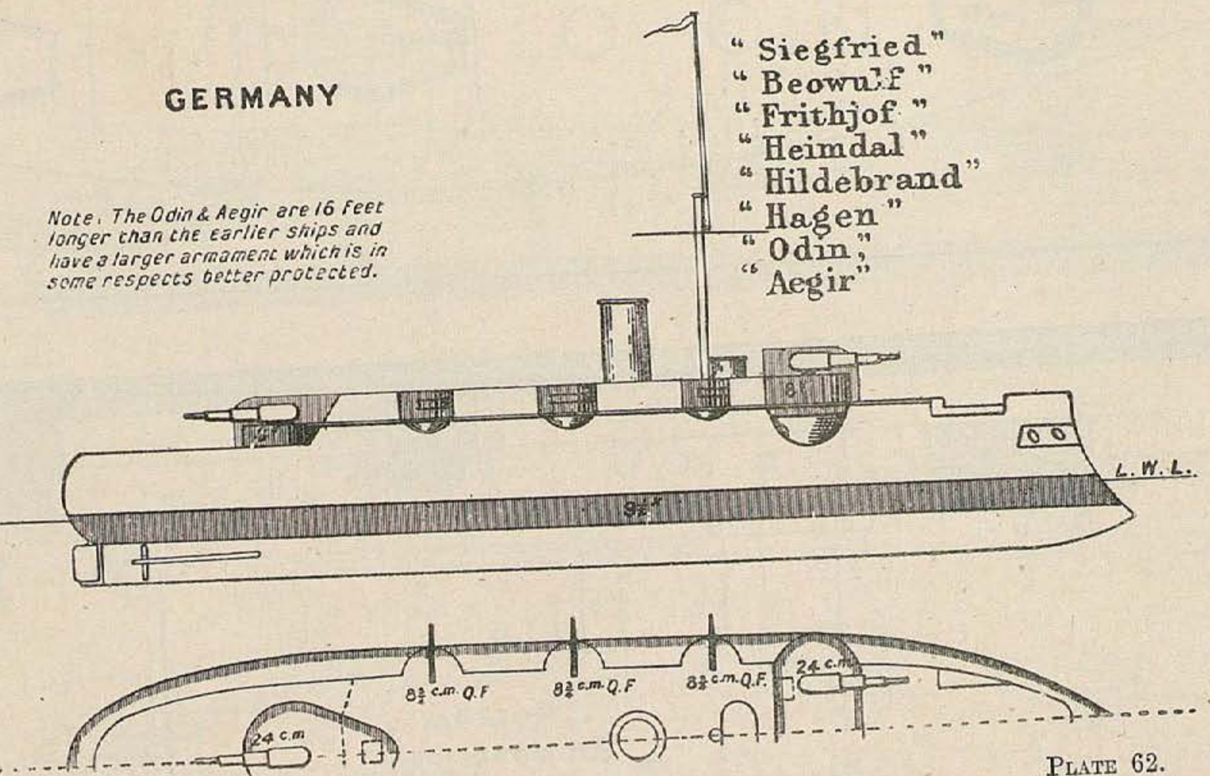
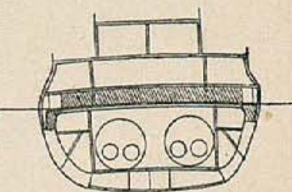

GERMANY
"Siegfried"
"Beowulf"
"Frithjof"
"Heimdal"
"Hildebrand"
"Hagen"
"Odin"
"Aegir"
Note. The Odin & Aegir are 16 feet longer than the earlier ships and have a larger armament which is in some respects better protected.
L.W.L.
9½"
8
24 c.m
8¾ c.m. Q.F
8¾ c.m. Q.F
8¾ c.m. Q.F.
24 c.m

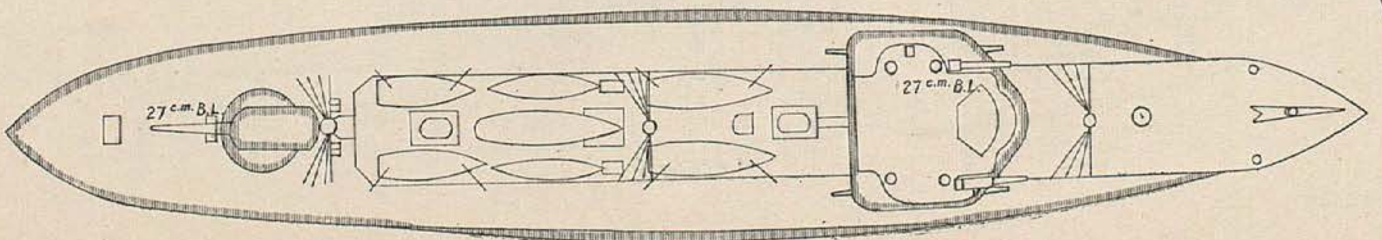
PLATE 62.

"Hydra"
"Psara"
"Spetsia"

L. W. L.



Midship Section



Upper Deck

PLATE 63.

ITALY.

"Andrea Doria"
"Francesco Morosini"
"Ruggiero di Lauria"

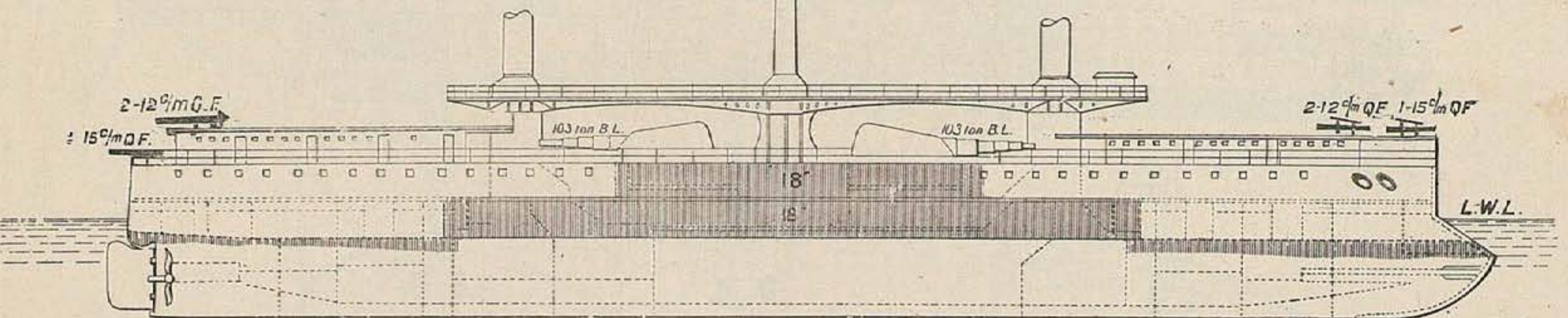


PLATE 64.

ITALY.

"Duilio"
"Dandolo"
(As refitted and rearmed)

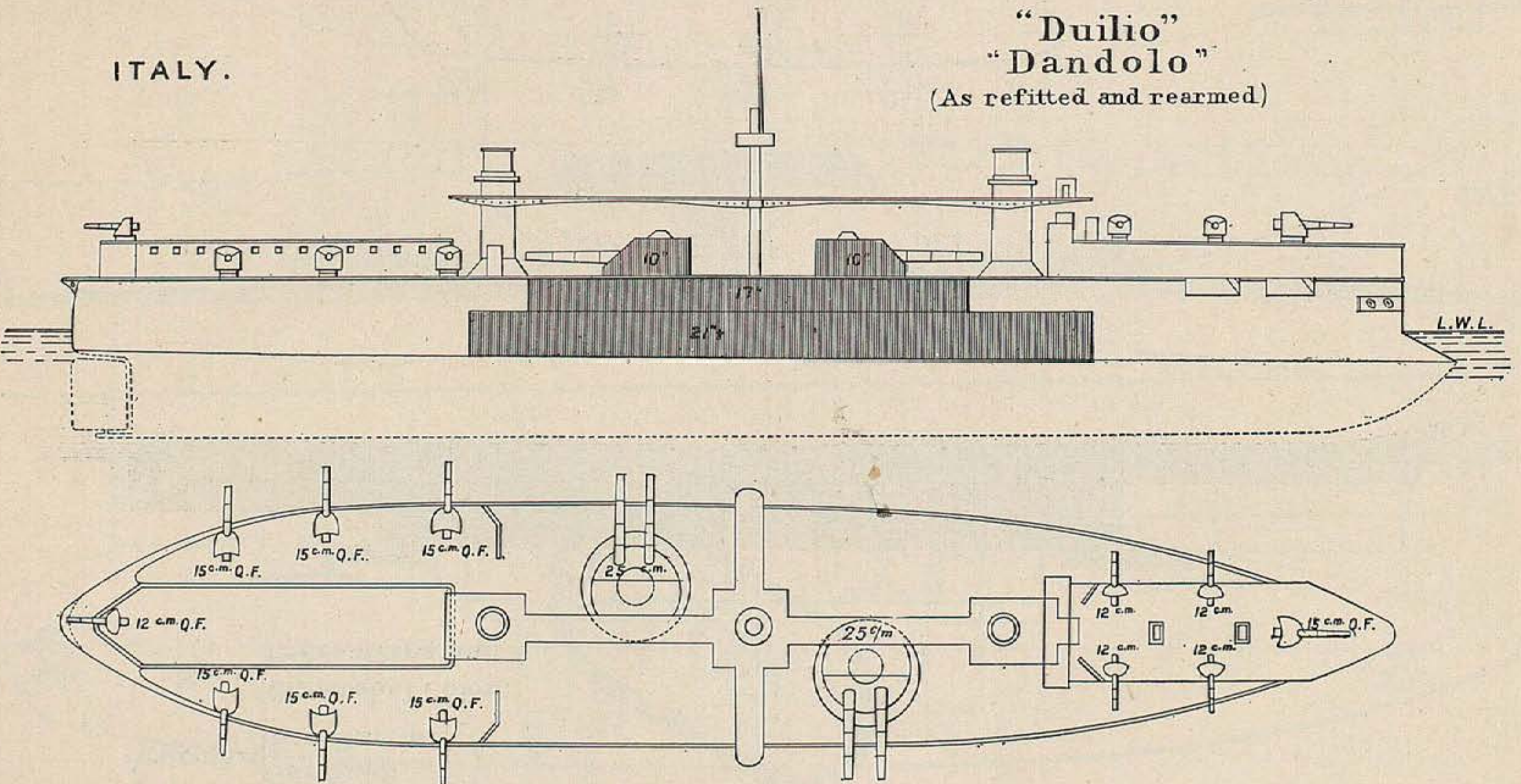


PLATE 65.

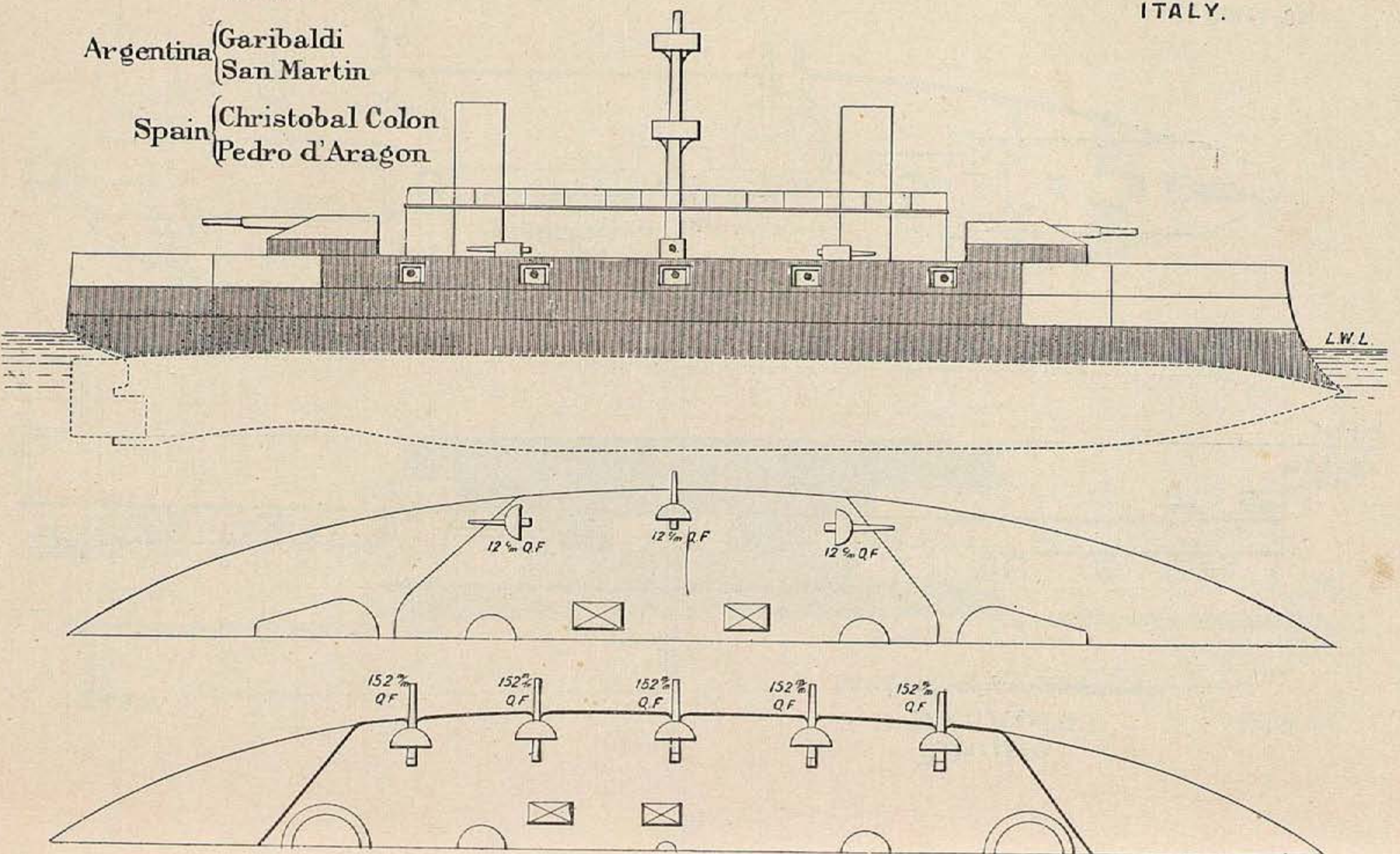
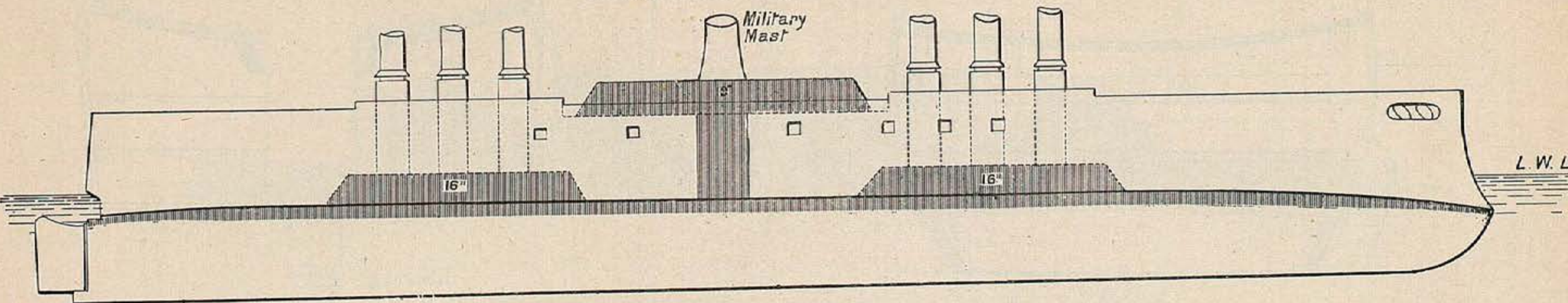

Guiseppe Garibaldi
Varese
Argentina {Garibaldi
San Martin
Spain {Christobal Colon
Pedro d'Aragon
ITALY.
L.W.L.
12 c/m Q.F
12 c/m Q.F
12 c/m Q.F
152 m/m Q.F
152 m/m Q.F
152 m/m Q.F
152 m/m Q.F
152 m/m Q.F

PLATE 66.

ITALY.

"Italia" and "Lepanto"

Note. *Lepanto has four funnels only, not six as Italia.*



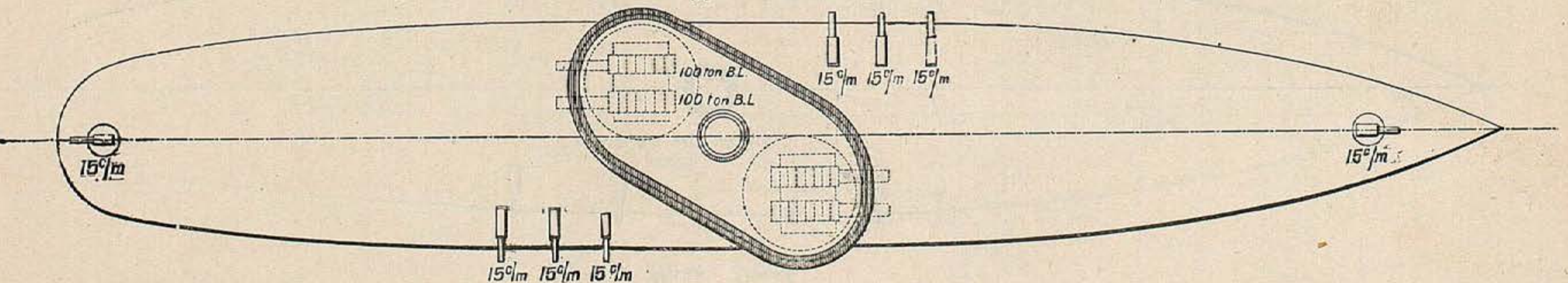
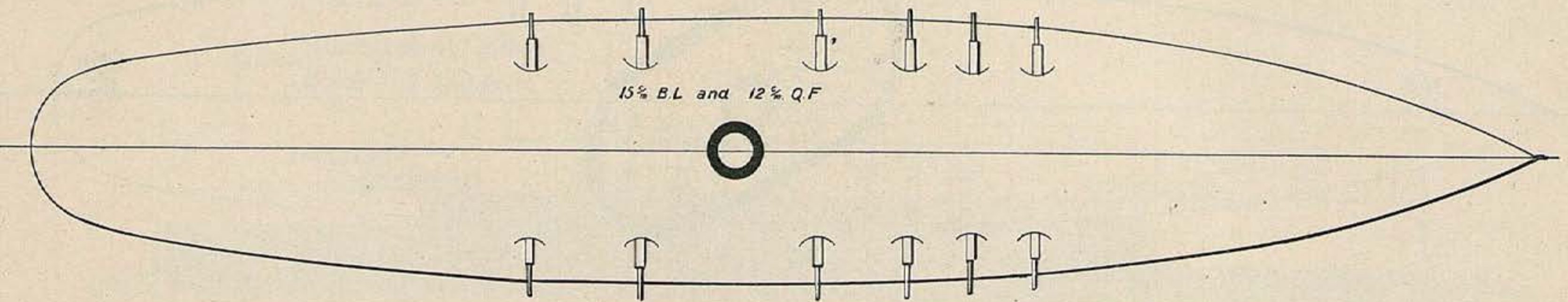


PLATE 67.

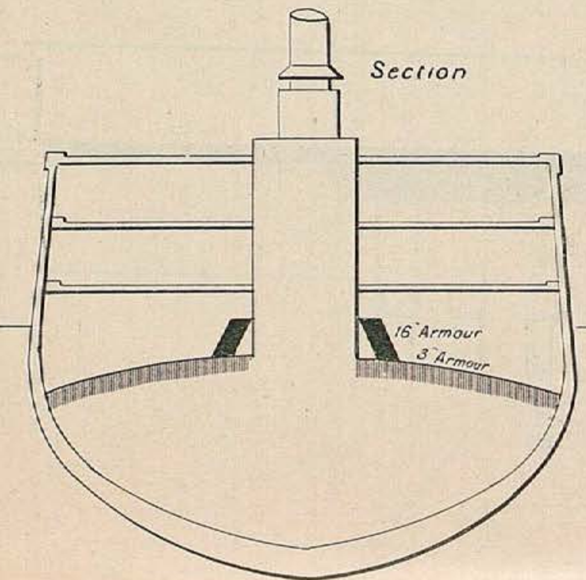
ITALY.

"Italia" and "Lepanto".

Main Deck



Section



Section

"Saint-Bon"
"Emanuele Filiberto"

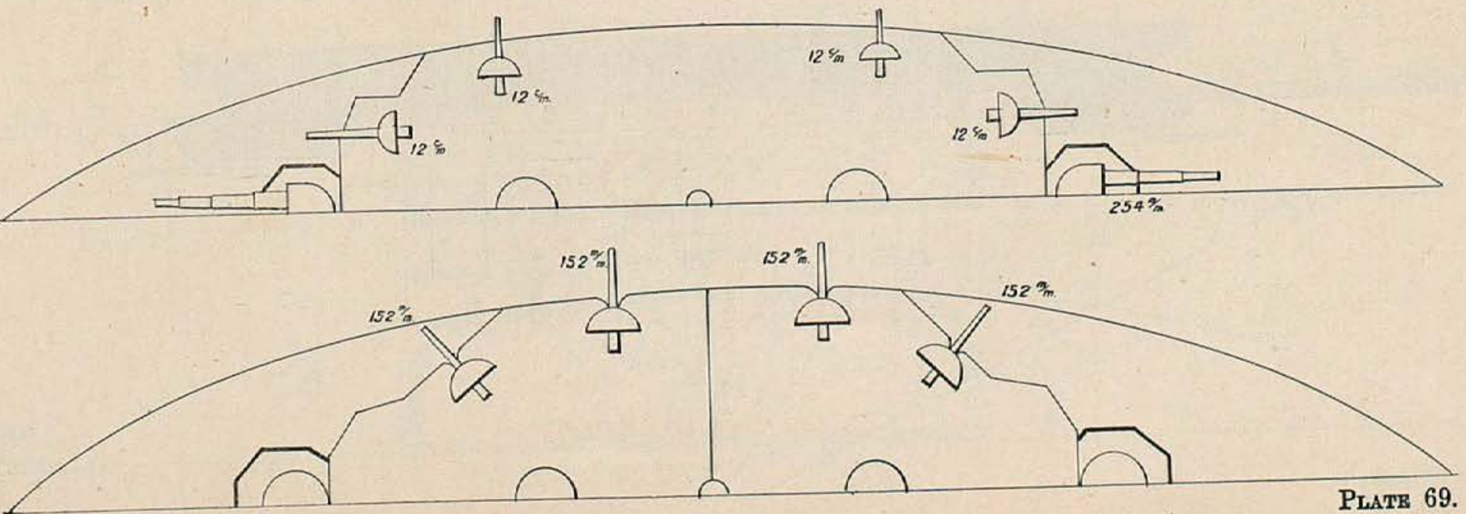


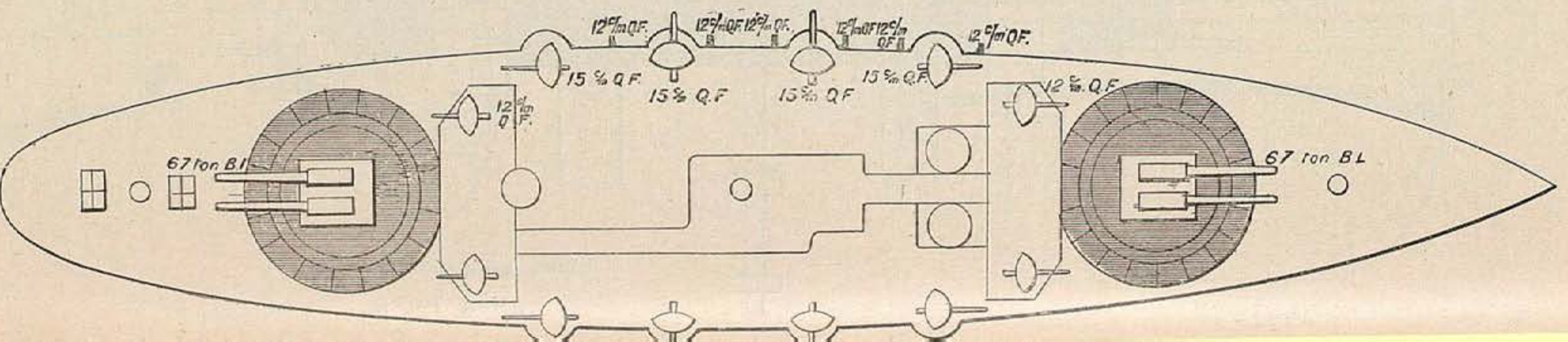
PLATE 69.

"Sardegna"

"Re Umberto"
"Sicilia"

ITALY

Note. *Sardegna is 9 ft. 10 in. longer and 3 ft. 3 in. broader than the other two.*



ITALY

"Vettor-Pisani"
"Carlo-Alberto"

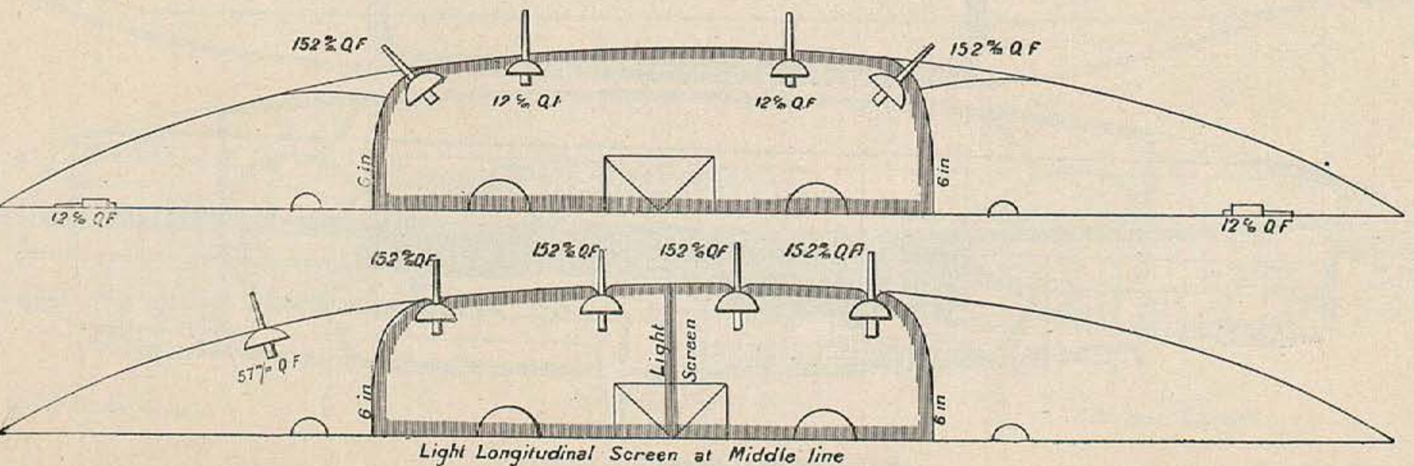
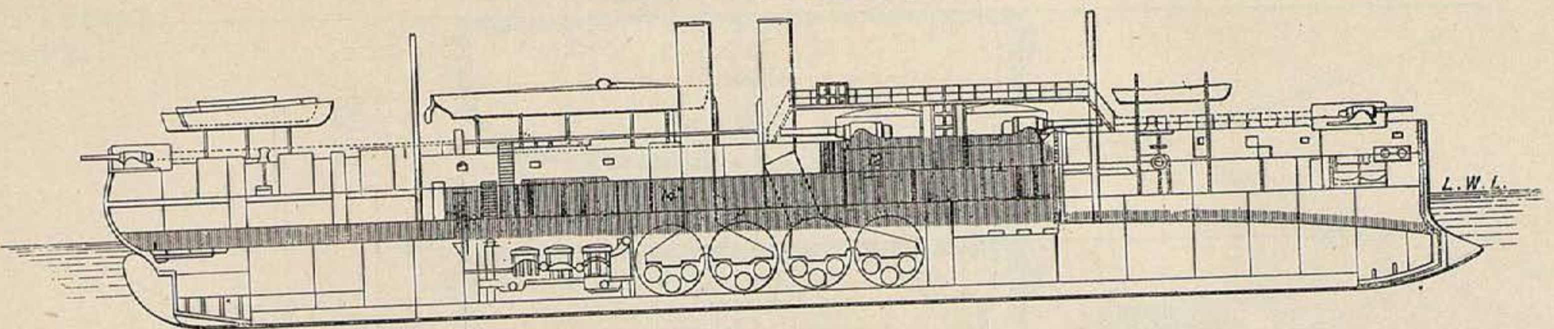
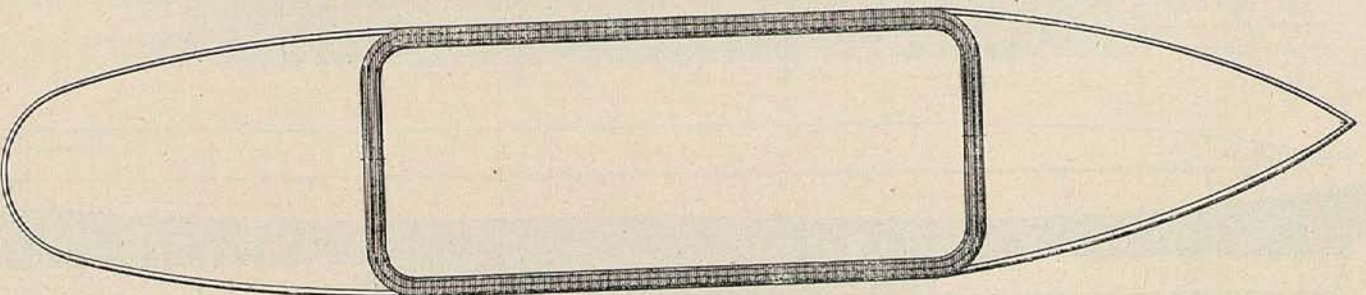
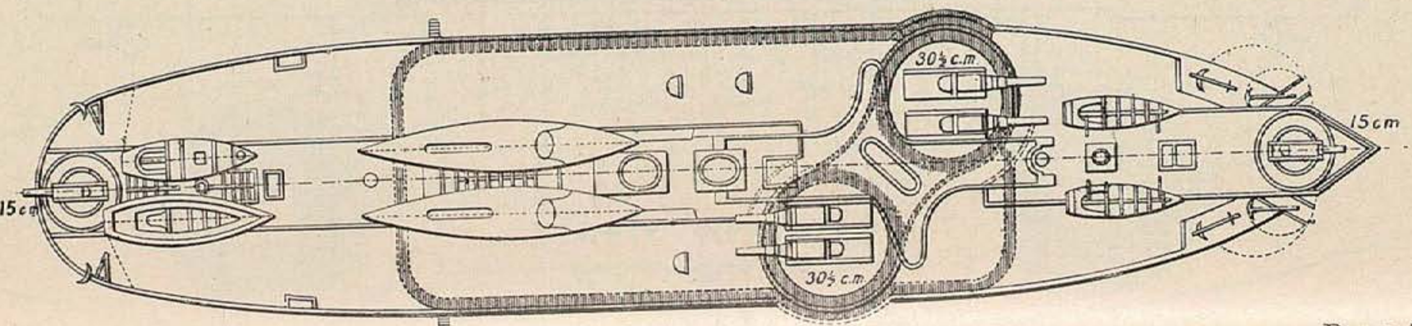


Plate 71.

JAPAN.
"Chen Yuen"
Taken from the Chinese





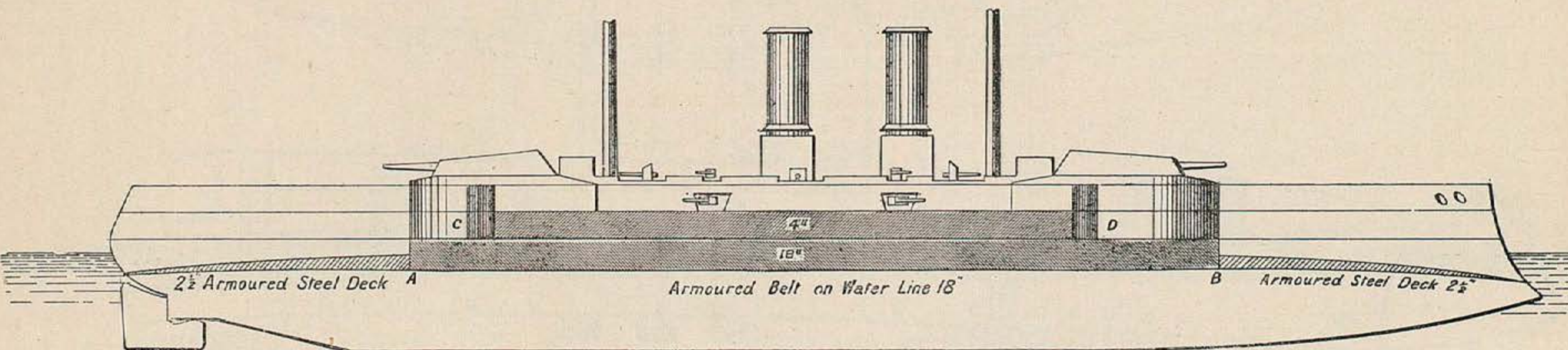


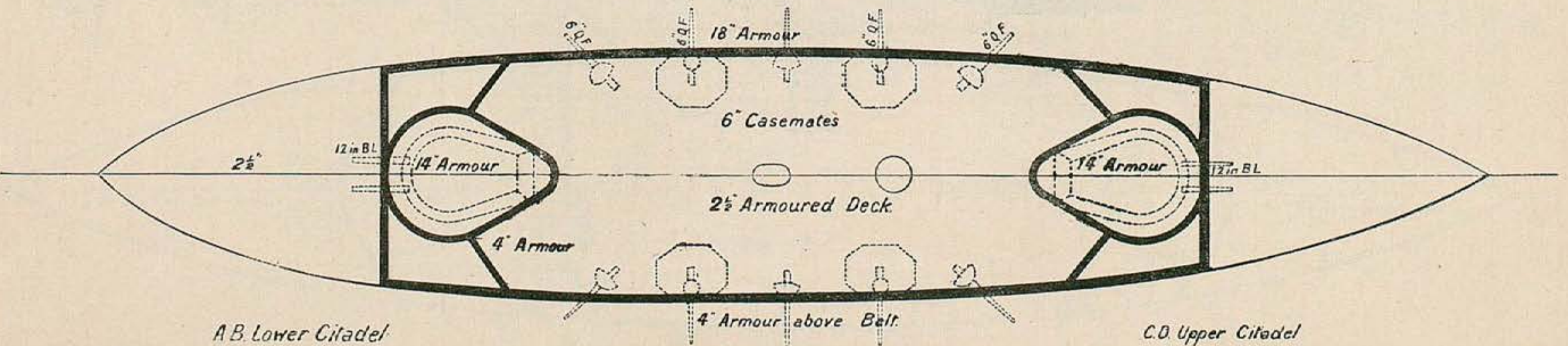
JAPAN.

FIRST CLASS BATTLESHIPS

"Fuji"

"Yashima"





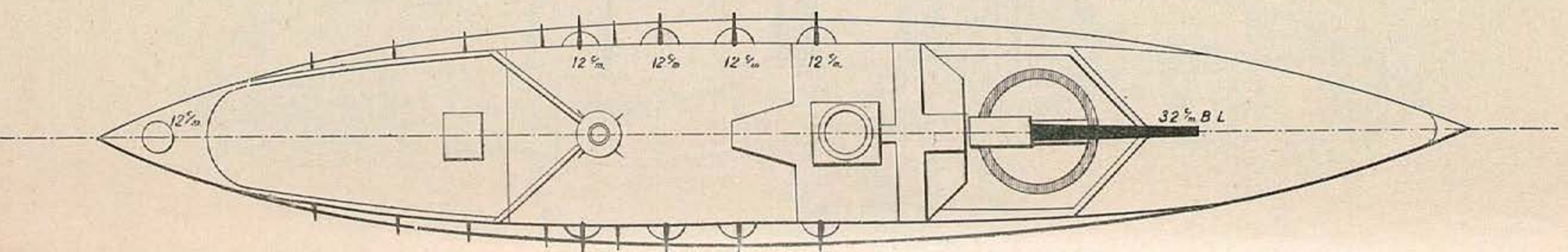
A.B. Lower Citadel

C.D. Upper Citadel

PLATE 73.

JAPAN.

"Itsukusima"



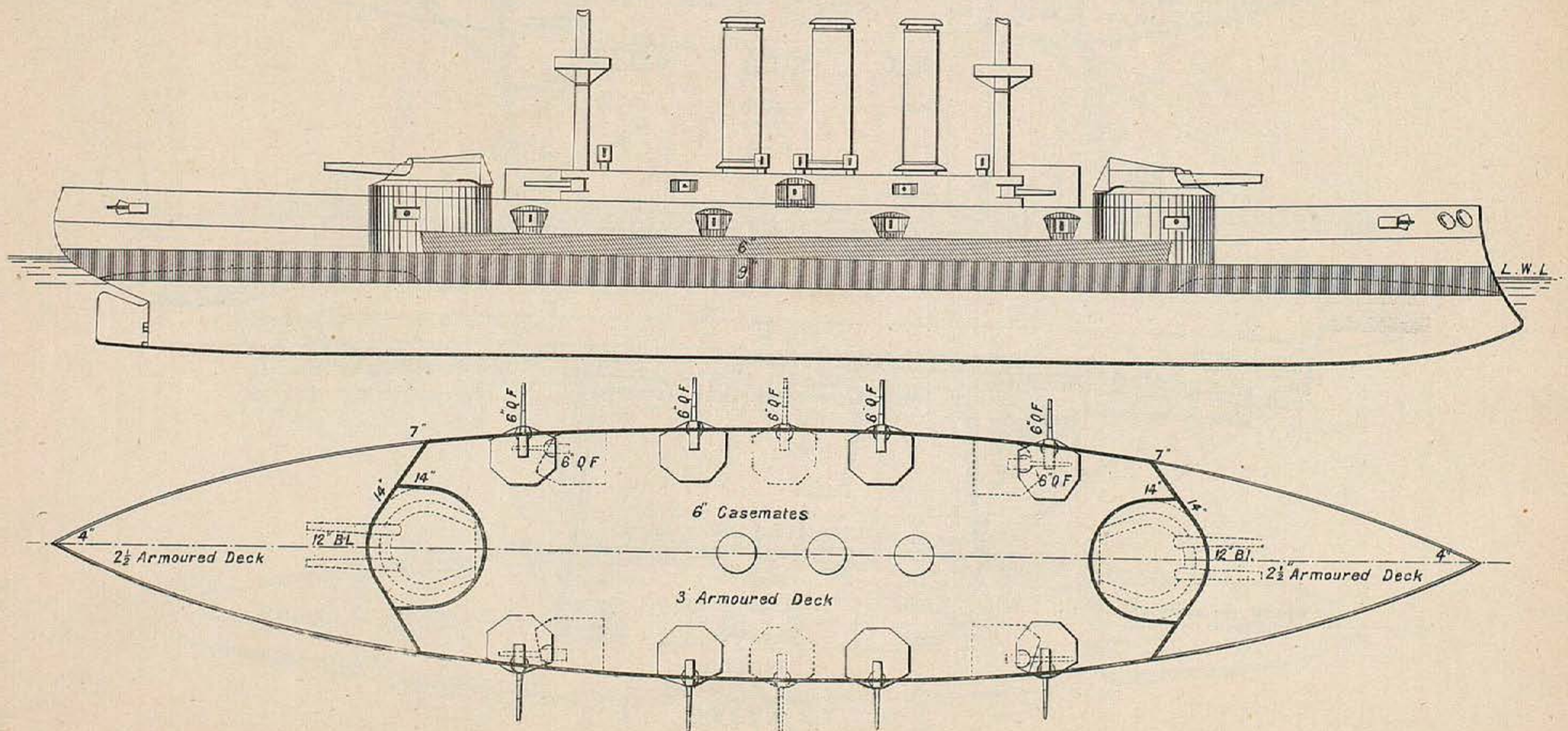
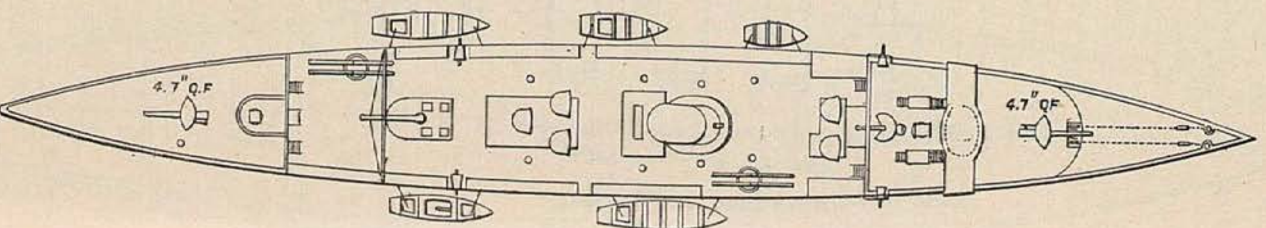

FIRST CLASS BATTLESHIP (Not yet named)
14.850 Tons. 14.500 IHP.
Building at the Thames Iron Works.
6"
9"
L.W.L.
6" Q F
7"
14"
6" Casemates
12" BL
4"
2½ Armoured Deck
3 Armoured Deck
12" BL
2½" Armoured Deck

PLATE 75.

JAPAN

"Tatsuta."

On Special Scale



JAPAN.

"Yoshino"

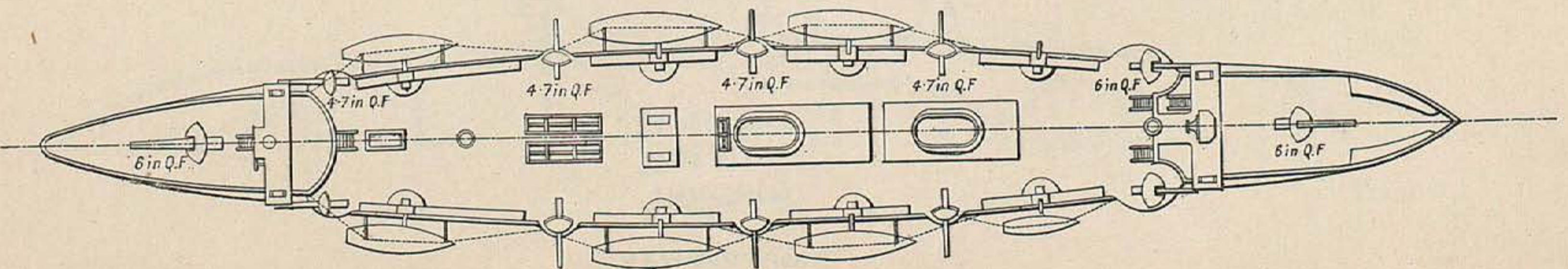
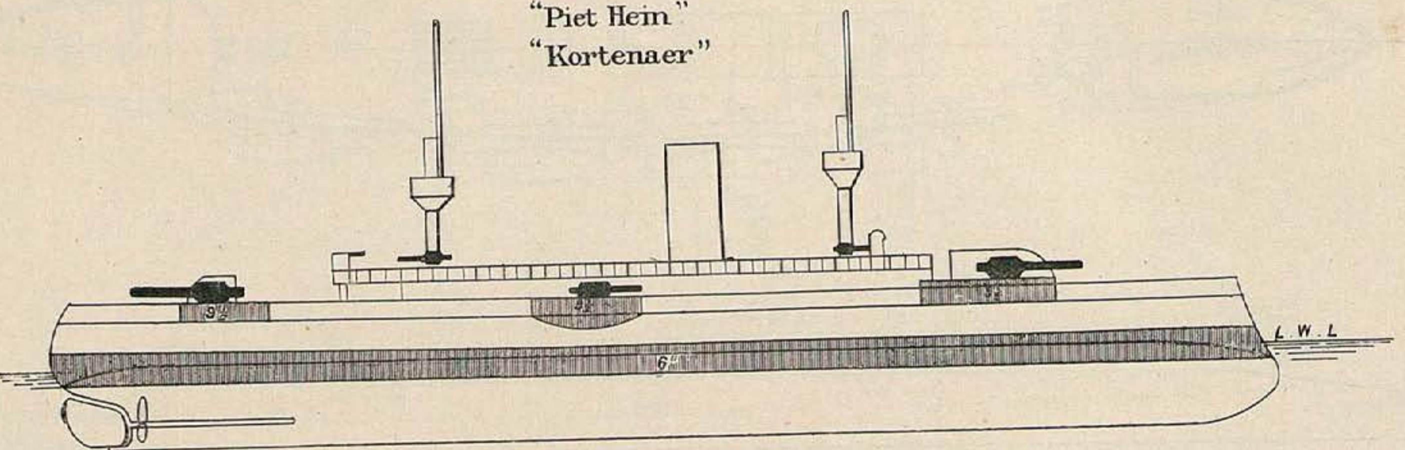


PLATE 77.

NETHERLANDS

"Evertsen"
"Piet Hein"
"Kortenaer"



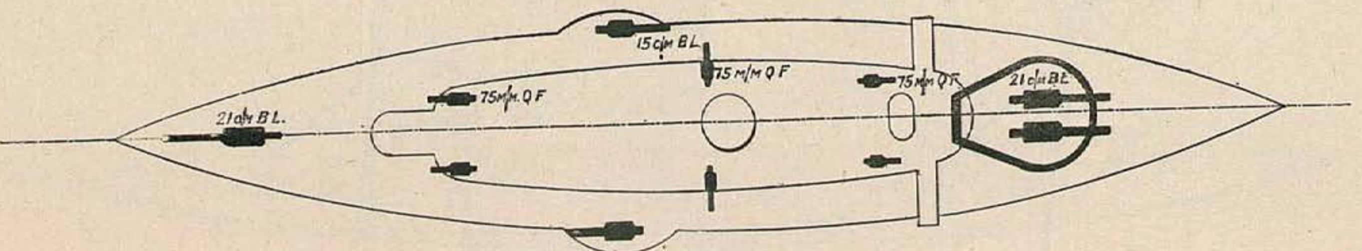


Plate 78.

NETHERLANDS

Koningin Wilhelmina de Nederlanden.

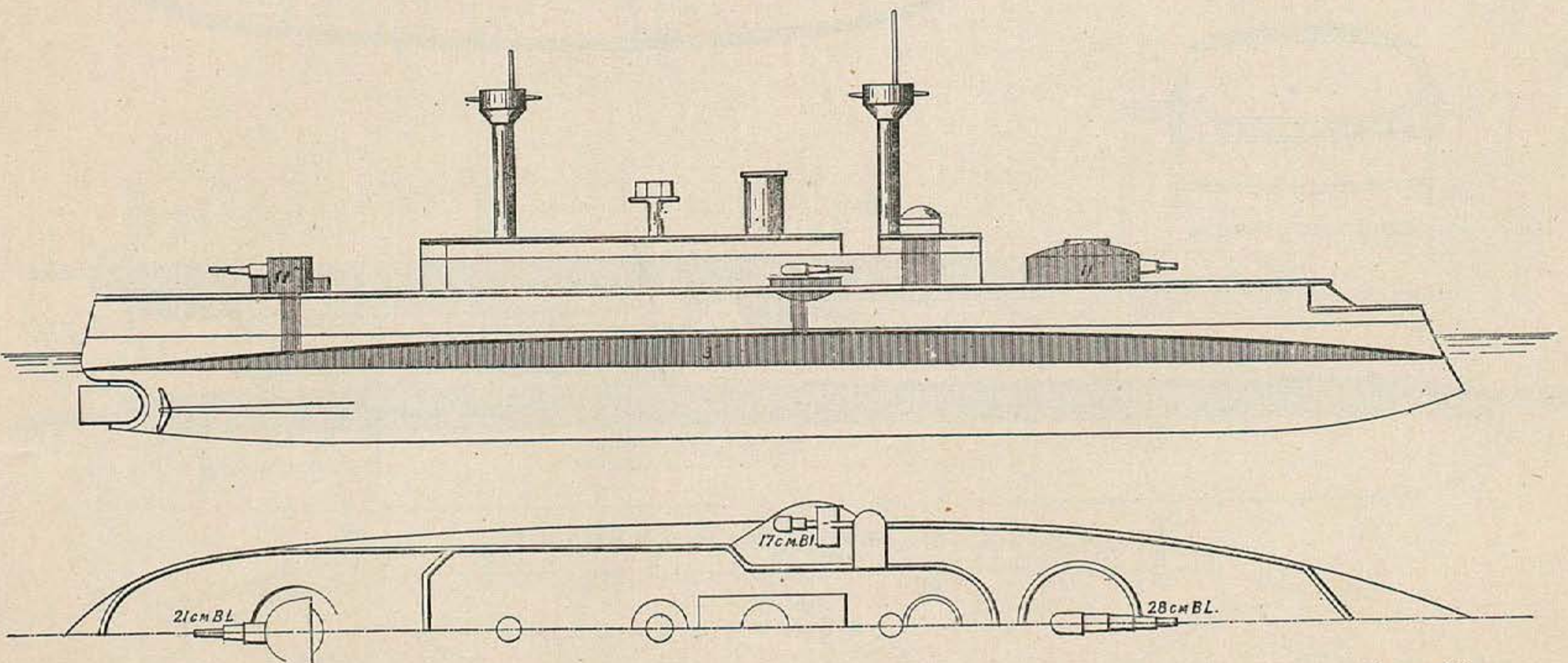
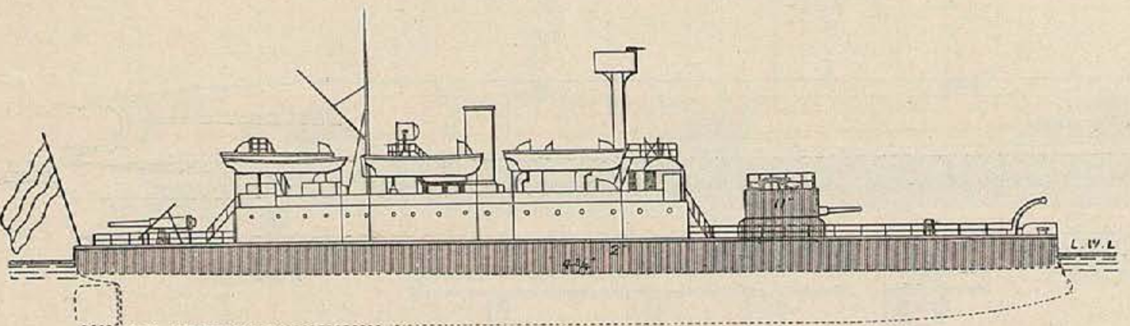


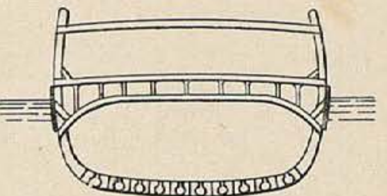
PLATE 79.

NETHERLANDS

"Reinier Claesen".



MIDSHIP SECTION



On Special Scale

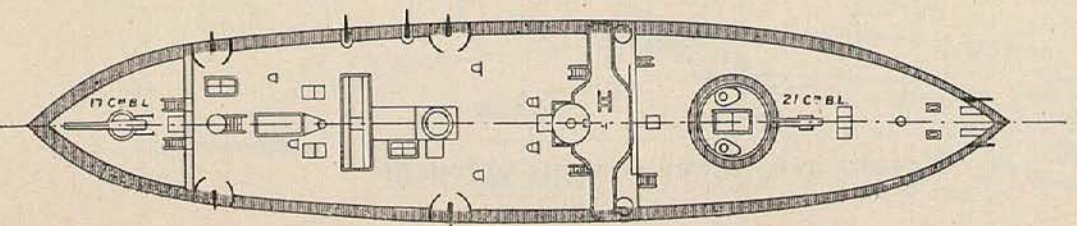


PLATE 80.

RUSSIA

"Admiral Nachimoff

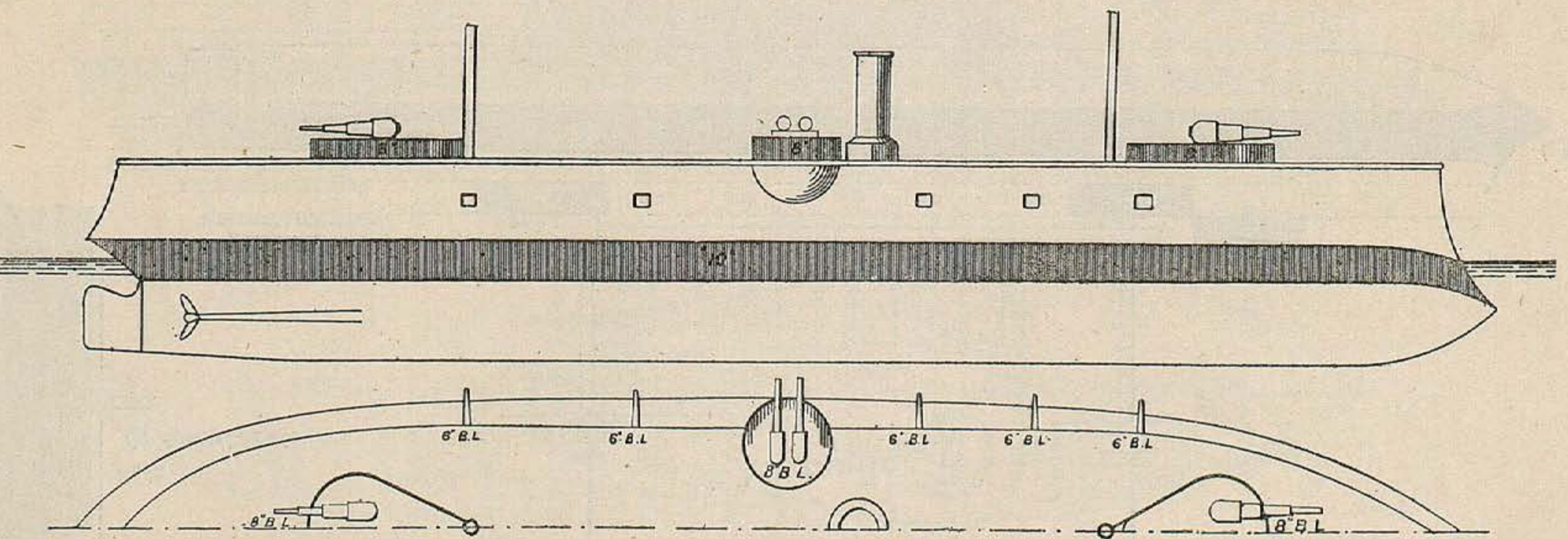
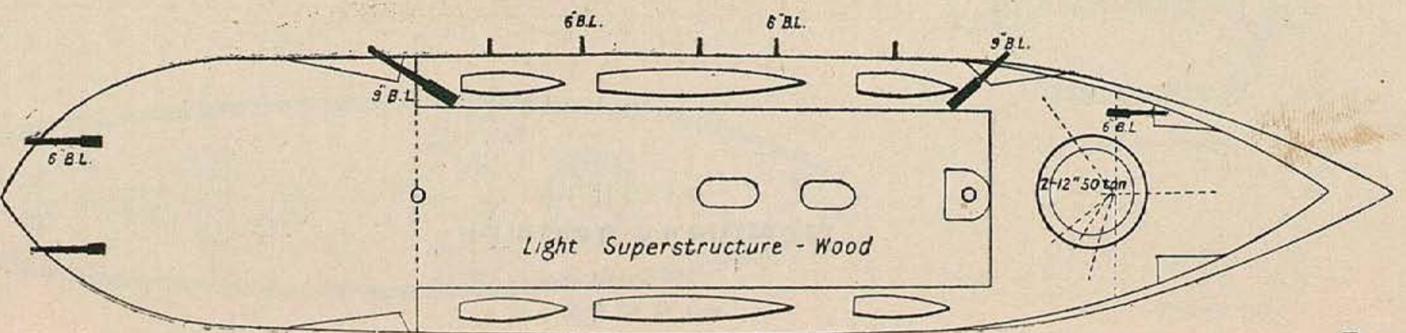


PLATE 81.

RUSSIA

"Alexander II"



RUSSIA.

"Catherine II." "Tchsmé." "Sinope."

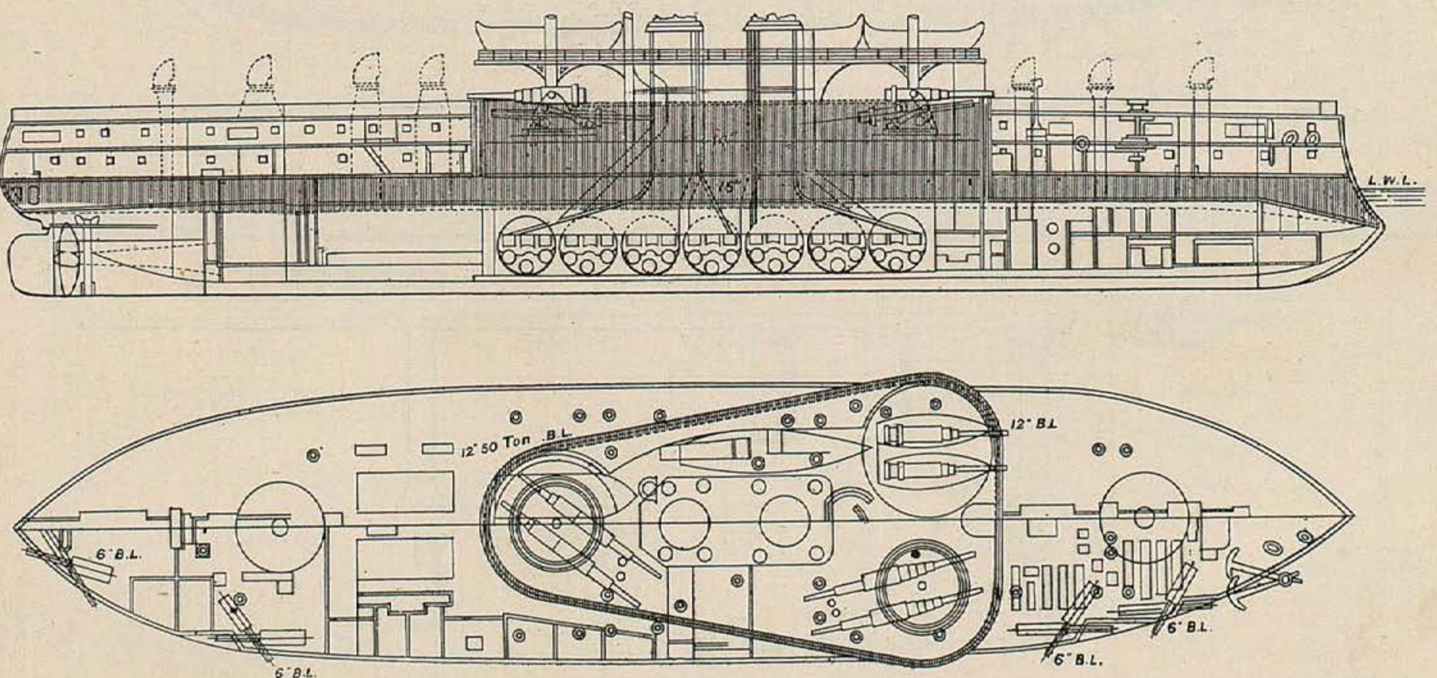


PLATE 83.

RUSSIA

"Nicolai I."

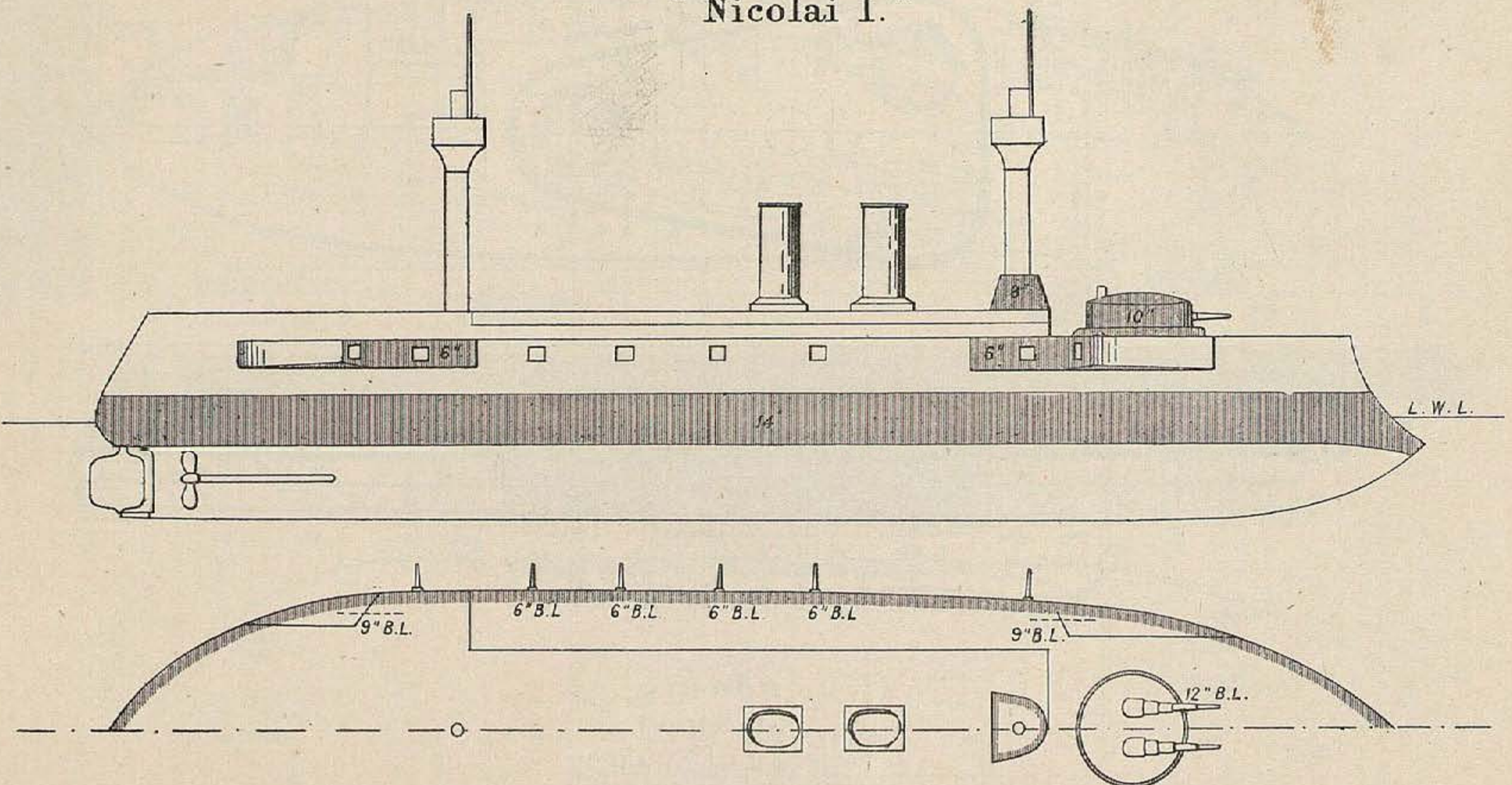


PLATE 84.

"Pamyat Azova."

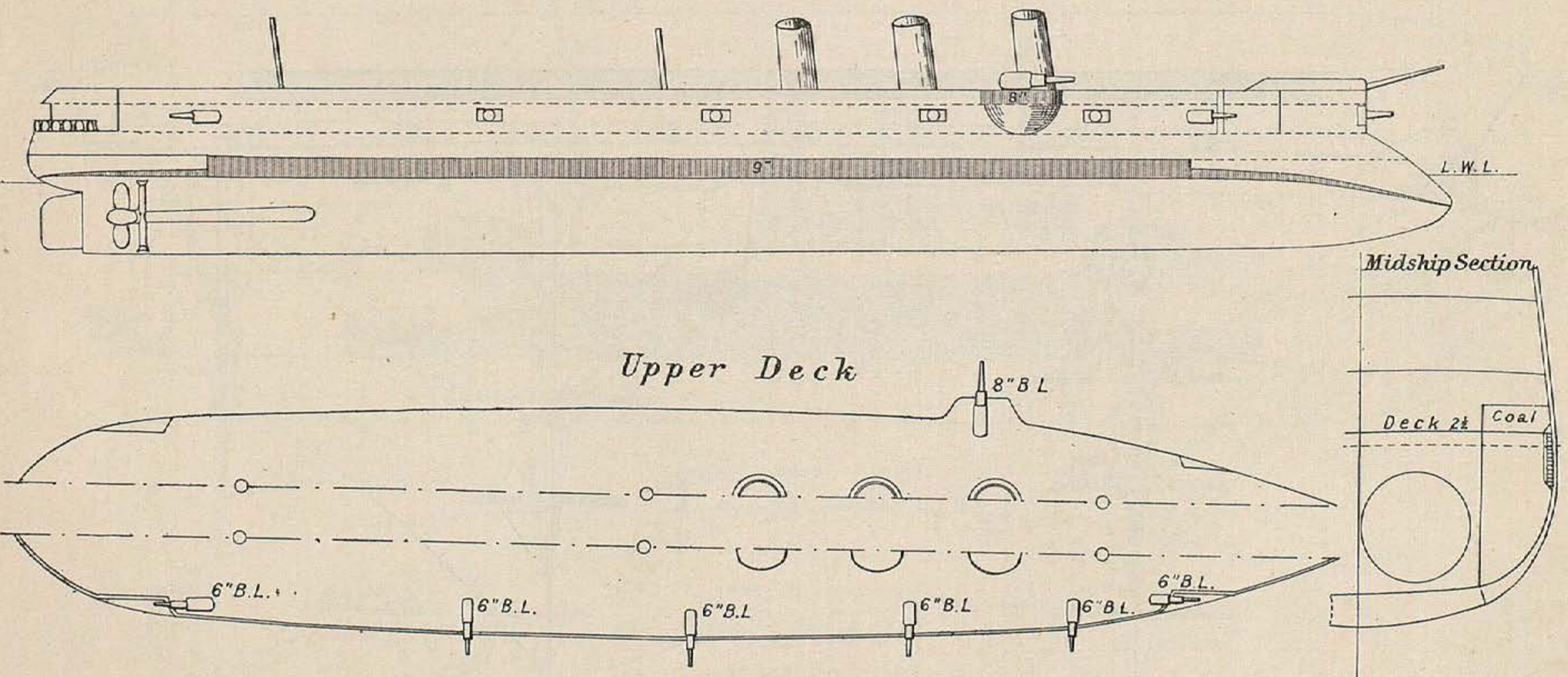
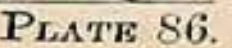


PLATE 85.

First Class Cruiser "Rurik."

L.W.L.
10"
6" Q.F.
8"
6" Q.F.
6" Q.F.
4"·7 Q.F.
6" Q.F.
4"·7 Q.F.
6" Q.F.
6" Q.F.
4"·7 Q.F.
6" Q.F.
8"
6" Q.F.
Br.



"Sissoi Veliky"

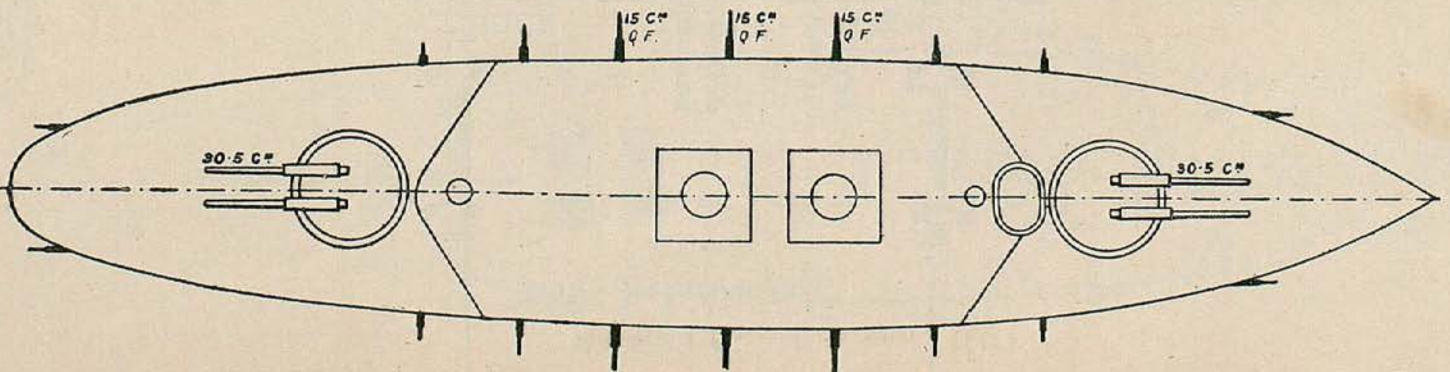


PLATE 87.

RUSSIA.

"Tria Sviatitelia"

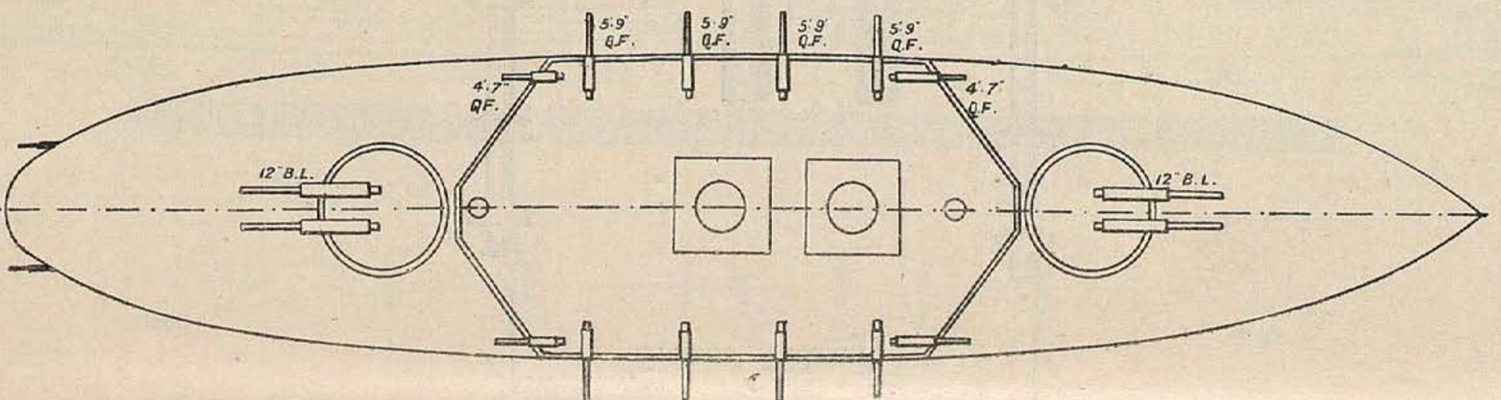
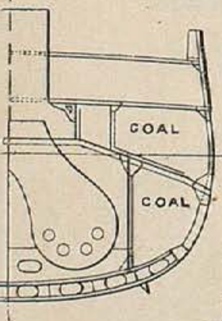


PLATE 88.

"Emperador Carlos V."



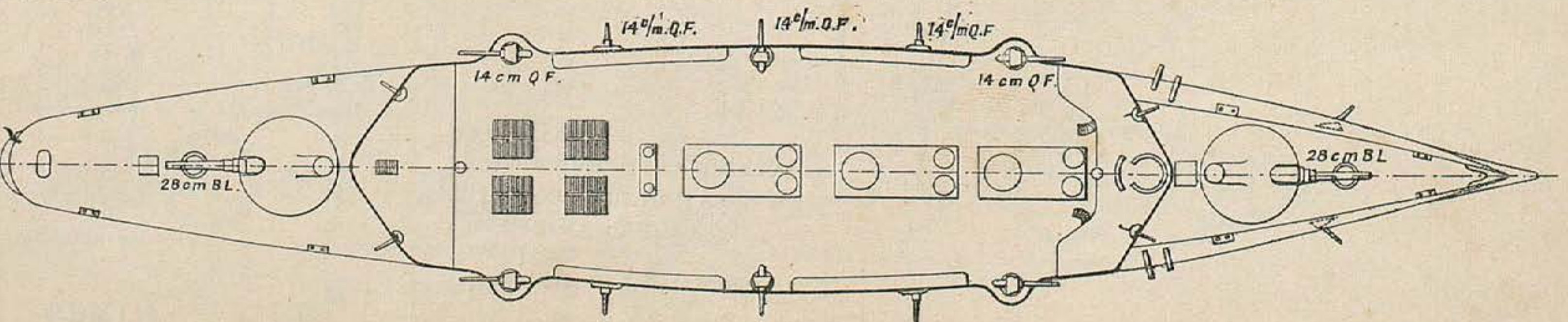
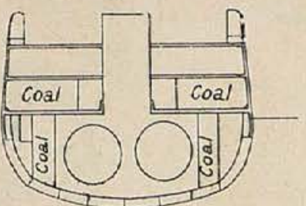


PLATE 89.

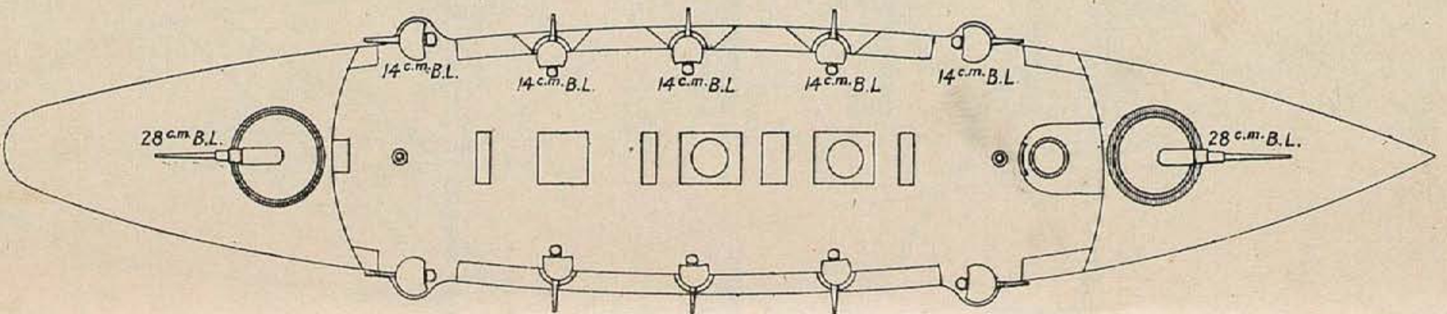
SPAIN

"Almirante Oquendo"
"Catalĩna"
"Cardenal Cisneros"
"Infanta Maria Téresa"
"Princessa de Asturias"
"Vizcaya"

Midship Section.



10½"
12"
10½"
12"
L.W.L.



SPAIN

"Pelayo"

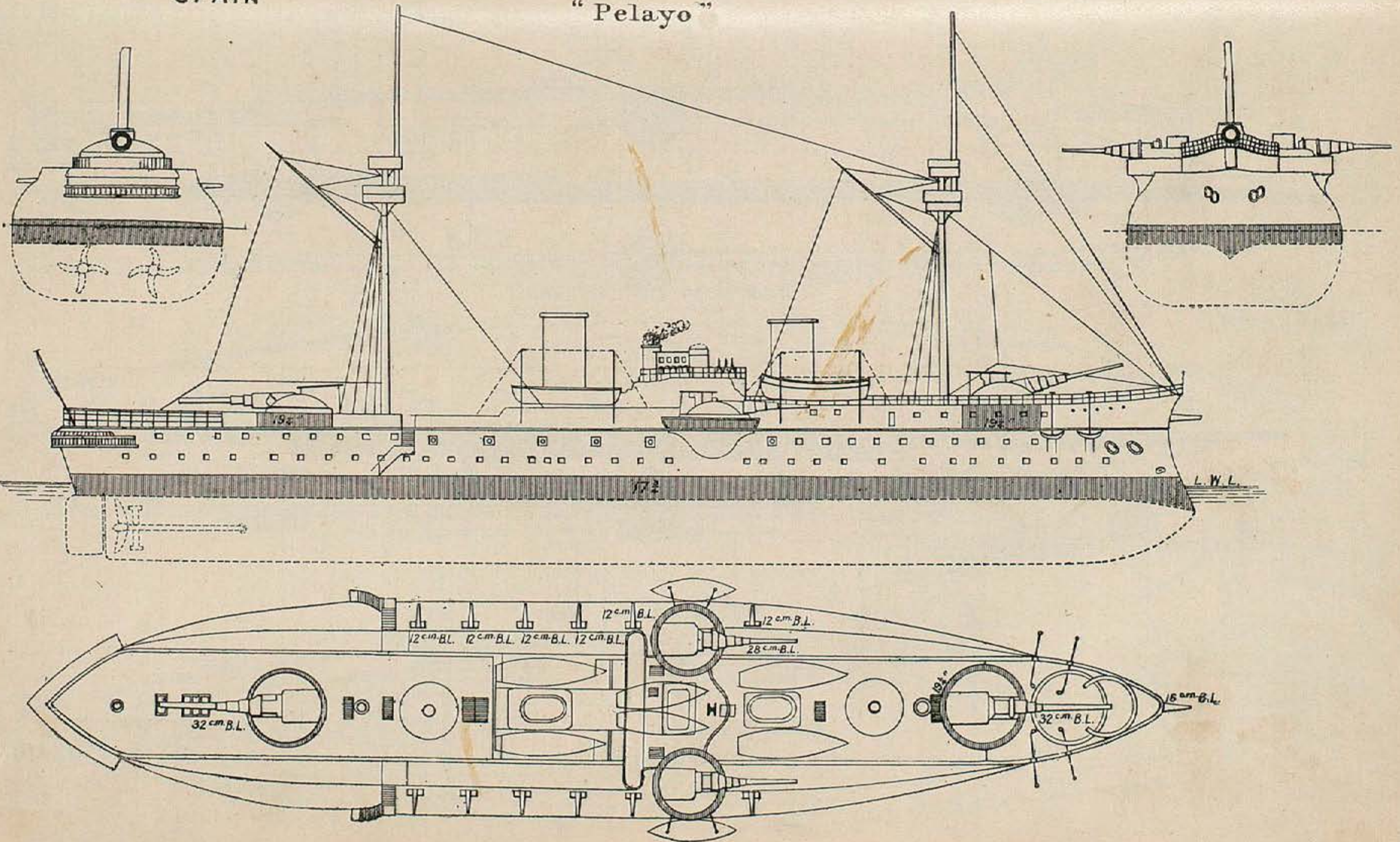
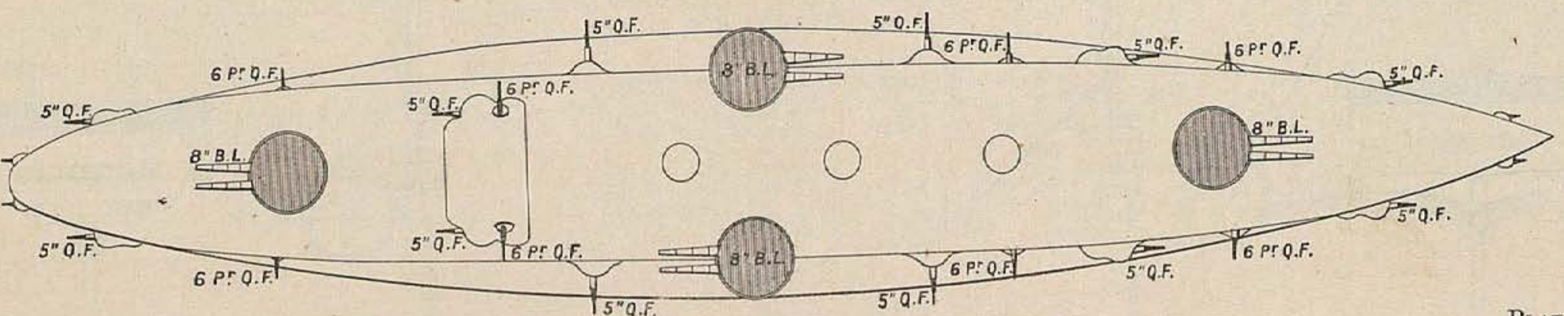


PLATE 91.

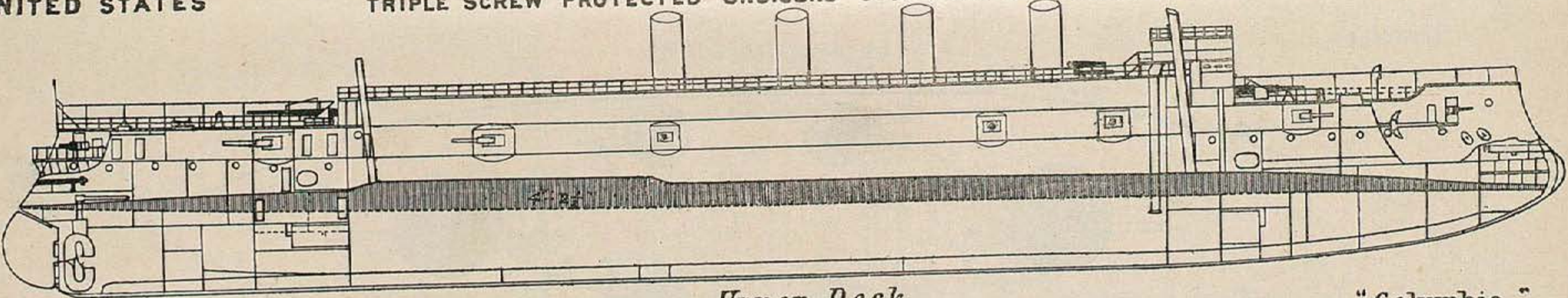
UNITED STATES.

"Brooklyn"
(Armoured Cruiser)



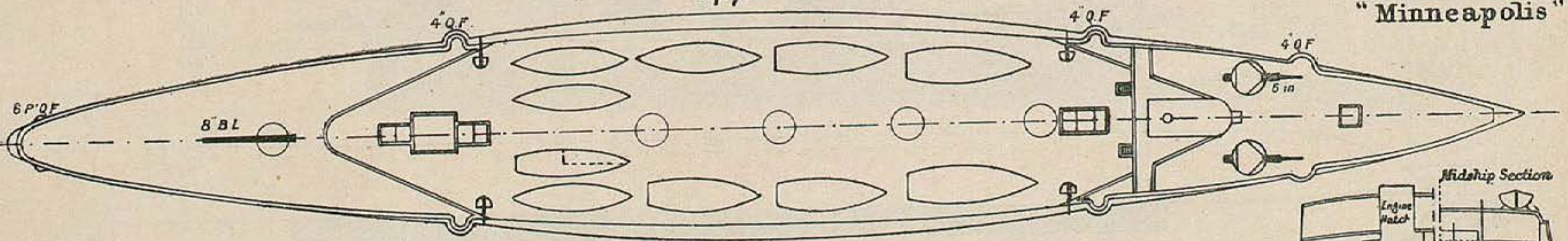
UNITED STATES

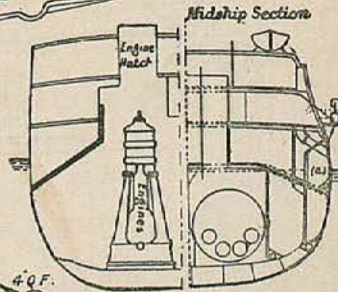
TRIPLE SCREW PROTECTED CRUISERS COLUMBIA & MINNEAPOLIS.



"Columbia"
"Minneapolis"

Upper Deck





Note. Minneapolis has only two funnels

Main Deck

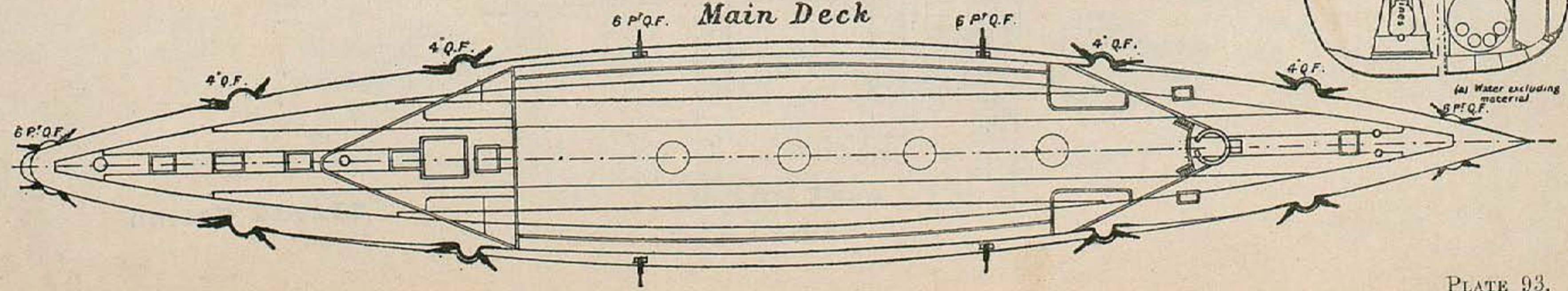


PLATE 93.

UNITED STATES.

"Iowa."
(Battle Ship)

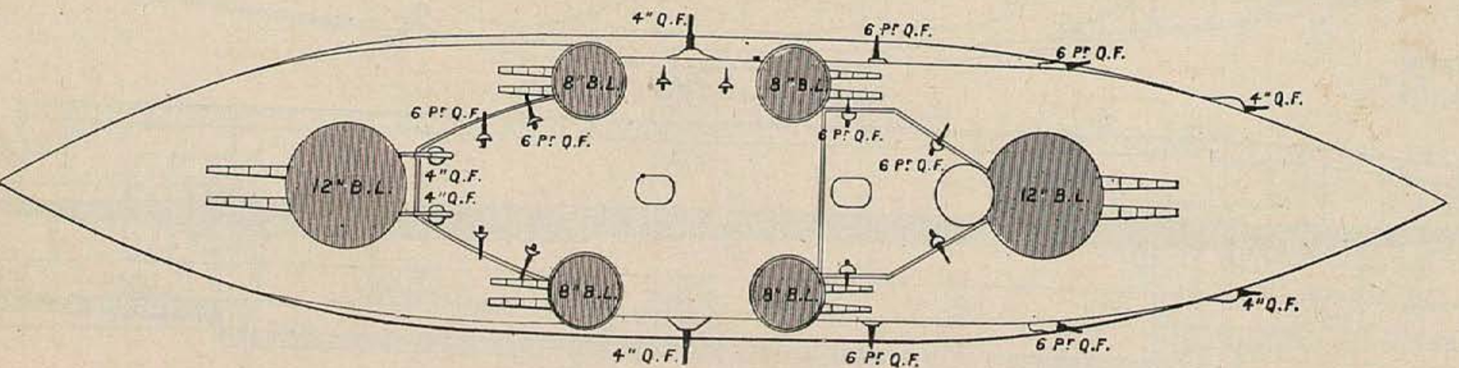


PLATE 94.

Nº 5 (Kearsage)
" 6 (Kentucky)
(Battle ships)

Sketch design.

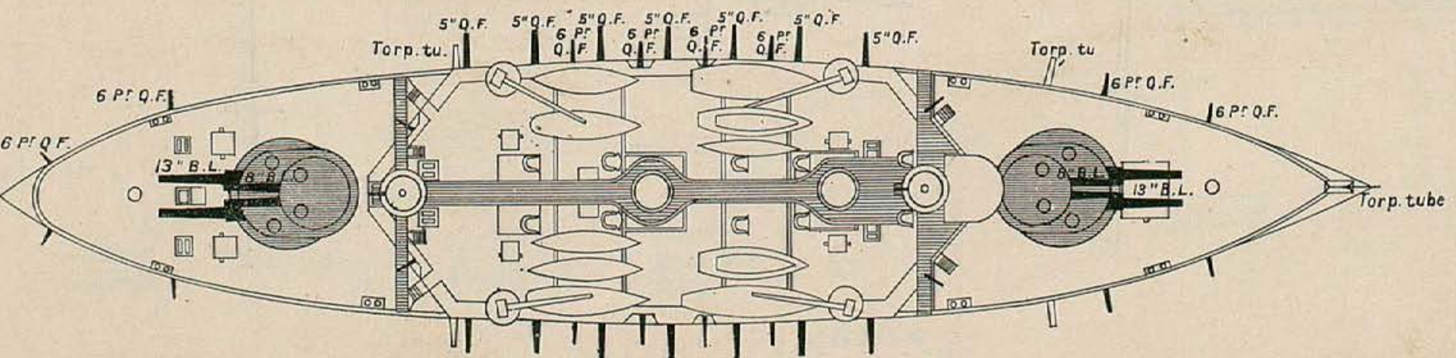


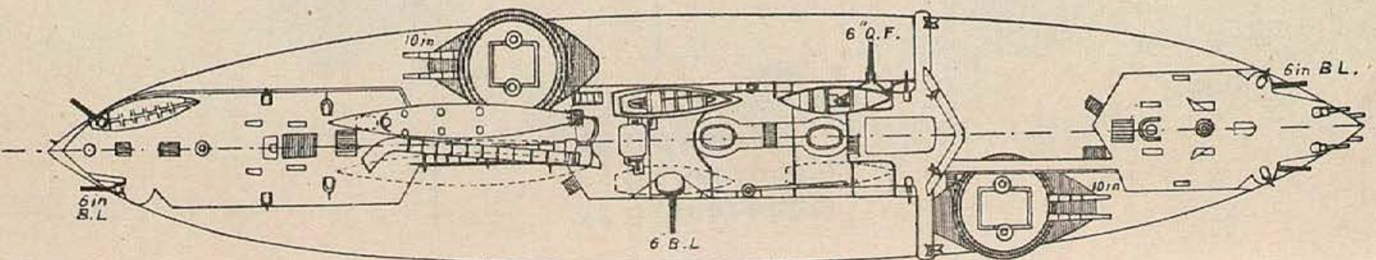
PLATE 95.

UNITED STATES

Armoured Cruiser "Maine"

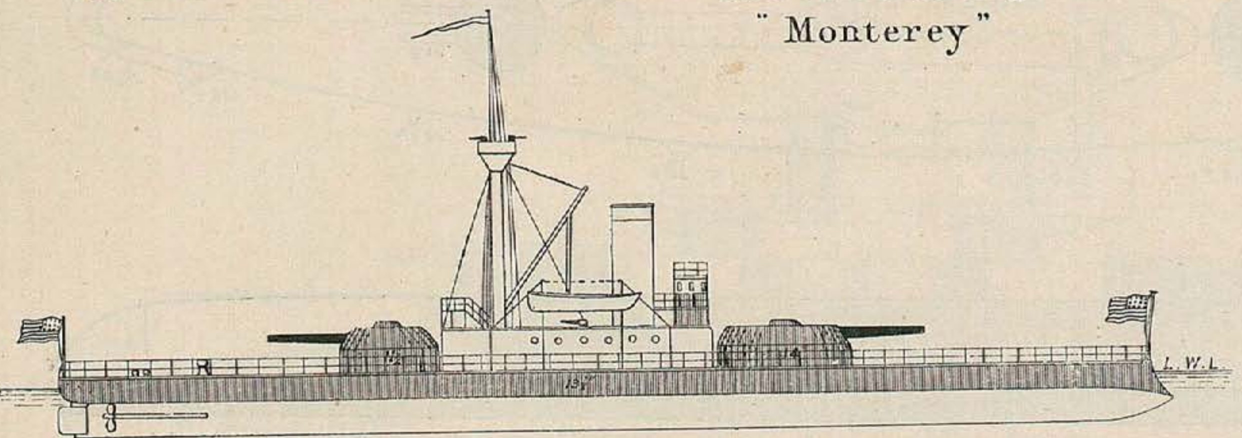
15/2/98.

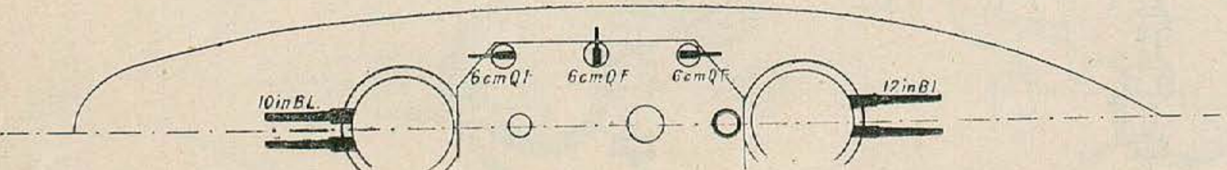
Main & Superstructure Decks



UNITED STATES

Coast Defence Ship
"Monterey"





Midship Section.

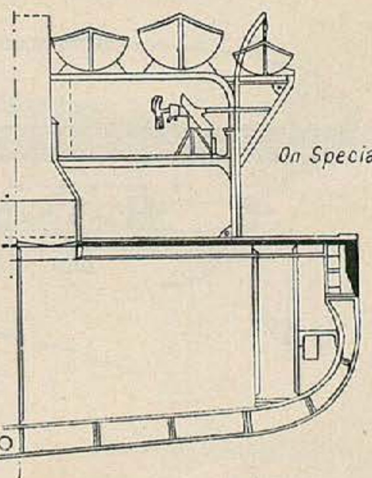


PLATE 97.

UNITED STATES

ARMOURED CRUISER.

"New York"

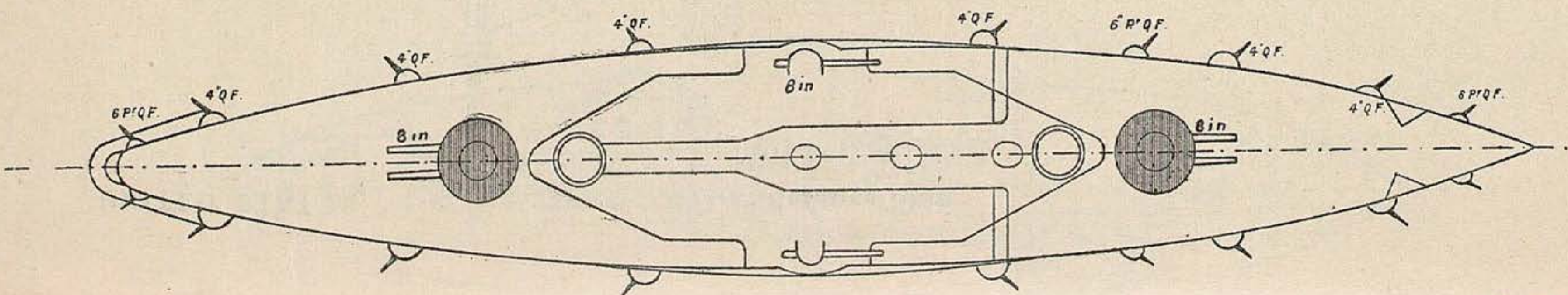


PLATE 98.

BATTLE SHIPS.

"Oregon"
"Massachusets"
"Indiana"

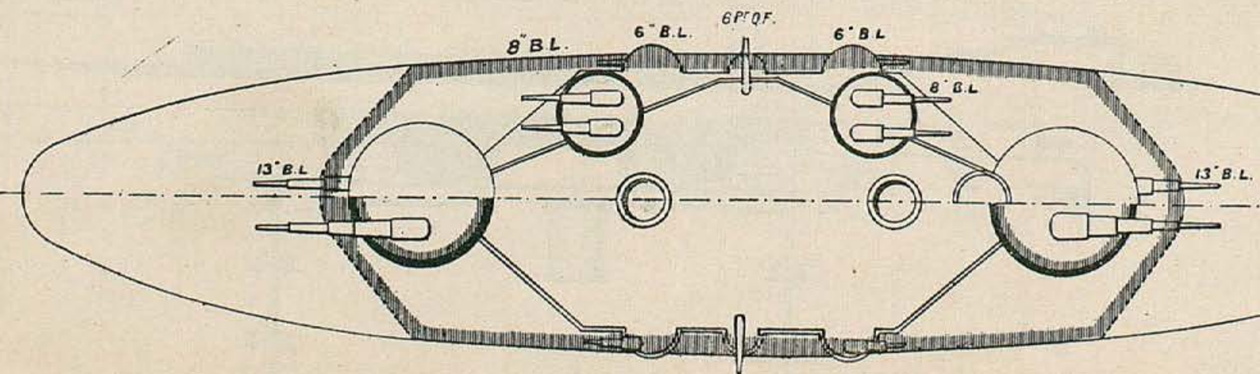
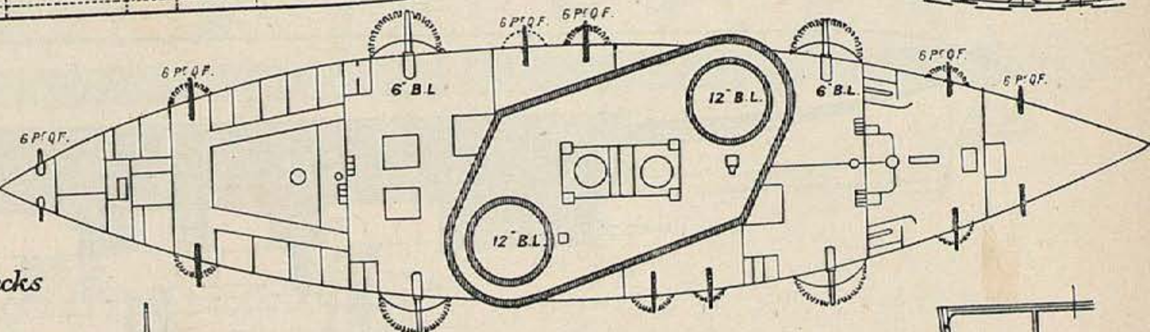
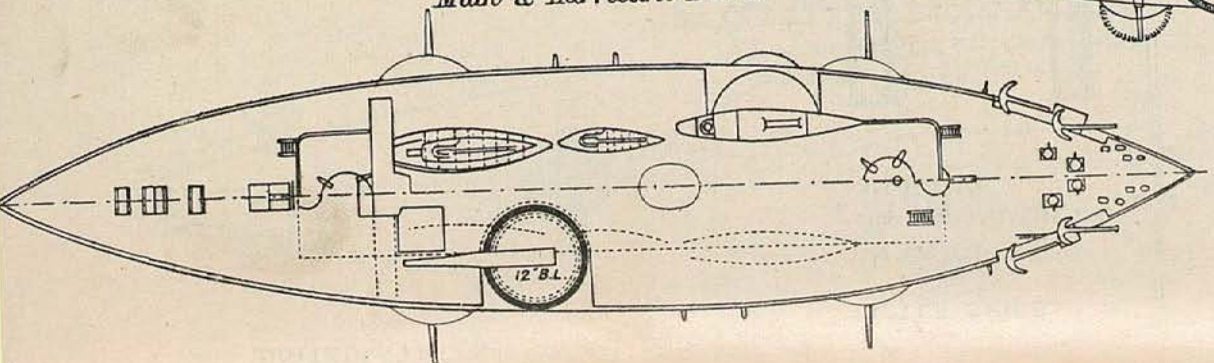


PLATE 99.

"Texas" UNITED STATES





Main & Hurricane Decks

PART III.

ARMOUR AND ORDNANCE.

PART III.

Armour and Ordnance.

CHAPTER I.

Armour.

In last year's *Annual* it was pointed out that every effort ought to be made to keep the manufacture of armour in England up to the standard that her position as the first Naval power in the world calls for. In a matter such as the manufacture of war *matériel*, in which all nations are interested, and in which strenuous efforts are constantly made to discover improvements, it would not be reasonable to expect that England should keep the lead absolutely in every branch of manufacture. At one time compound armour was being made at nearly all foreign establishments on the Sheffield patents, but this could not continue for ever. A new discovery may at any time be made as to design or process of production in the United States, Germany, or France which will give an immediate advantage to the makers, and this has taken place again and again. What we have a right, however, to expect is, that no such advantage should be allowed to remain long without being at least equalled, or else acquired by our Government. Our ships should be fully as well equipped as those of any other Power, and they should, therefore, be protected with the best armour that can be made. Our power of production should be kept up by making armour for such nations as will purchase it, and for this it is clearly necessary, not only that our Sheffield makers should actually make the best class of armour, but further, that they should be well known

Authorities.—The *Engineer* for plates and matter. The United Service Institution Proceedings. *Engineering*. United States information from abroad: *U. S. Engineering News*, Captain Cowles, U. S. Naval Attaché, Lieutenant Meigs of Bethlehem, Colonel Hunsiker of Carnegie's Works, Captain Jaques, Herr Krupp, Captain Tresidder of Brown's, Mr. Wilson of Cammell's, Mr. Albert Vickers, Mr. Hadfield, and information obtained from official sources.

throughout the world to do so. On this account, when Harvey's process gave great results, it was rightly secured by all our English makers. Last year it was apparent to any unprejudiced expert that the value of nickel in imparting toughness had been well established, and that Krupp, by means of his gas process, had obtained extraordinary success in combining great hardness with "still more remarkable toughness" in very thick plates. Consequently, if English armour was to hold its own, results rivalling those published must be obtained by the processes used by English manufacturers; or if this should be unattainable, it followed that nickel, and possibly the gas process of Krupp, should be applied to the manufacture of English armour. Our Sheffield makers, Messrs. Brown, Cammell and Vickers, are to be congratulated on having faced the question and thoroughly met it. All three makers are now using nickel for armour supplied to our Navy. All three have acquired the right to use Krupp's process. At the present time, at Cammell's it is considered that as good results are obtained from the Harvey process, nickel being employed; but at Vickers and Brown's the Krupp gas process is said to offer the special advantage of producing thick armour-plates of such toughness that it is impossible to break them through. This was indeed the special characteristic of the Krupp plate, on which such stress was laid in the last *Annual*. In hardness, it is considered apparently by all our makers that the Harveyed process rivals that of Krupp. It is very satisfactory to be able to give so good an example of what has been accomplished in our own country as the Cammell plate, whose trial will be described further on.

Introduction of Nickel and of the Krupp process.

Increased stringency of English tests.

Another distinct advance is shown in the greatly increased stringency of the test now adopted for plates for service. A 6-in. plate is now called upon to defeat the attack of five 6-in. Holtzer shot fired with about 2000 ft.-secs. velocity, and it is understood that the heavier plates will in future be subjected to firing-trials to govern their supply.

There is said to be a disposition in the United States Congress to establish a Government armour factory to act as a check on the two private factories.

Armour-piercing shot.

Caps on shot points.

Progress has been made in the manufacture of armour-piercing projectiles in this country during the year, both in our Royal Laboratory at the Woolwich Arsenal and by private makers. Col. Bainbridge has succeeded in making a 6-in. shot which has passed unbroken through a 9-in. steel plate with a water-hardened face supplied by Vickers. It must be confessed, however, that the perforation of Harvey plates proper is a very difficult matter, unless a cap be em-

ployed on the shot. Against the adoption of the cap it is objected that at angles more oblique than 20° with the normal, or 70° with the face of the plate, the cap offers no advantage, and that 20° is less than two points of the compass; further, that a cap only assists in the attack of plates with hardened faces, and that few ships as yet carry such plates, and that capped projectiles could rapidly be supplied at short notice if desired. On the other hand, it appears necessary to make more experiments than have been carried out in this country in order to arrive at the best arrangement of cap to apply it effectually, if its adoption at any time is contemplated. It appears that the caps latterly used in Russia were hard steel, and presumably these gave very much better results than the wrought-iron caps; so much so, that the wrought-iron cap suddenly dropped into oblivion, and a rather clumsy attempt was made to keep the new steel caps a complete secret, the shot being termed magnetic shot. The Johnston's capped shot in the United States have achieved remarkable performances, as noticed hereafter; and, although from the escape of a cap in the bore, one gun has been destroyed in Russia and one in the States, both countries have, it is believed, adopted capped shot. All this points to the conclusion that the introduction of the cap in England is a mere question of time, and it is much to be desired that experiments should be made with steel caps of varying hardness, especially striking at an angle.

The following experiments with plates and projectiles may be recorded:—

Harveyed Carnegie armour delivered for service.

At the beginning of the year 1896, in the course of supplying armour for the battleship Iowa, an 8-in. curved plate of Carnegie-Harveyed nickel steel was tested with 6-in. Wheeler-Sterling projectiles, with a perforation equal to that of 10·8-in. and 12·3-in. of iron, so that the plate would be put as equal to 1·4 and 1·5 its thickness in wrought iron. The shot's weight was 100 lbs., its higher velocity was 1846 ft.-secs., its energy 2365 ft.-tons, or 482·7 ft.-tons per ton of plate. The plate resisted perforation, breaking up the shot, but the plate also broke up. The plate on this was rejected.

A curved plate 7 in. thick, on 12th February, 1896, broke up Carpenter and Wheeler-Sterling 6-in. projectiles with 1620 and 1821·5 ft.-secs. striking velocity and 1820 and 2287 ft.-tons energy. One fine surface crack only was made. The calculated perforations were 10·1 and 12 in. of wrought iron, the plate thus being put at equal to 1·4 and 1·7 times its thickness in wrought iron, and 151·8 and 190·8 ft.-tons energy per ton being delivered on it. This it bore very well, showing nothing but one slight surface crack, and on this result was passed. The two above-mentioned

tests are worth noting, as showing roughly the limits of passing and rejection of high-classed curved armour as supplied for service.

Figs. 1 and 2 show a 15-in. Harveyed nickel Carnegie steel plate which was attacked by the following blows from a 12-in. gun, from projectiles of about 850 lbs. weight.

Projectile.	Striking Velocity.	Striking Energy.	Energy per ton of Plate.	Calculated Perforation through Wrought Iron.	Relation of Perforation to Thickness of Plate.
	Ft.-secs.	Ft.-tons.	Ft.-tons.	Inches.	
1. Wheeler-Sterling .	1,413	11,770	401	17·0	1·13
2. Carpenter . . .	1,760	18,260	622·2	23·6	1 58
3. Wheeler-Sterling .	1,727	17,570	598·0	22·9	1·53

Fig. 1 shows the effect of the first round, which penetrated 13·25 in. without cracking the plate or breaking the bolts. The shot rebounded 100 ft. and split in two. The second shot broke up, leaving its head embedded in the plate and breaking the plate through the two shot-holes. The third shot broke up, leaving its head embedded in the plate and opening the horizontal crack to the extent shown in Fig. 2. While the resistance of this plate falls far short of that of the Krupp 11·8-in. plate (given in the *Annual* for last year), which entirely defeated three 12-in. shots with much more striking energy, it must be remembered that while the Krupp* was a specially selected or champion plate, which had not been subjected to bending, the Carnegie was picked out of a batch of plates supplied to the service and bent to the desired form, and was probably selected as likely to be the worst, judging from the samples of metal, etc., examined. The plate was clearly capable of entirely defeating the last round with a perforation of 1·5 times its thickness of wrought iron and delivering a shock of about 600 ft.-tons per ton, and this implies a very high degree of excellence for a sample of manufacture.

5-inch double-forged plates.

On 24th March, 1896, at Indian Head, was tested the first 5-in. double-forged Harveyed Carnegie armour. The test was made to govern the supply of 350 tons of armour to Russia. The plate entirely defeated the attack of five 4-in. projectiles, with striking velocities varying from 1660 to 1760 ft.-secs. These broke up,

* Krupp states that the plate referred to could be bent, and very fairly urges that Sheffield makers would not have purchased his process had they not been satisfied on this head. This does not, however, prevent the need of pointing out the actual conditions of the trials above referred to. There is every reason to believe that Krupp will be able to furnish admirable results with bent plates, and perhaps could do so now.

with penetration not exceeding 2 in. A crack was made in one corner. A 5-in. shot with 1705 ft.-secs. velocity caused a vibration which detached a fragment at the corner. The armour was passed as most satisfactory. The perforation through iron by Tresidder's formula are 8 in. and 9¼ in. The plate therefore defeated an attack equivalent to 1·85 of its thickness after repeated blows equal to 1·61 of its thickness.

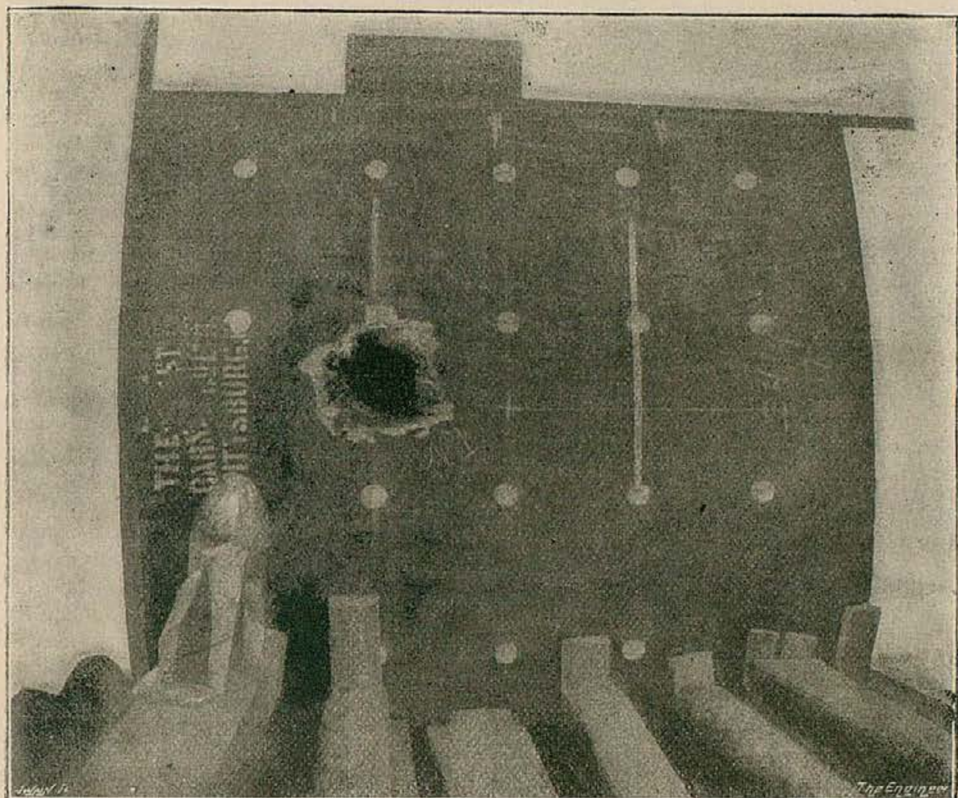


FIG. 1.—CARNEGIE BARBETTE PLATE.

The following trial of an English plate shows a great advance in resisting power, and may be regarded as satisfactory evidence of our armour being such as we should desire. It took place on 22nd September, 1896, on board H.M.S. Nettle at Portsmouth. The plate was furnished by Messrs. Cammell. It is of Harveyed steel, containing, among other elements, nickel. It measures 8 ft. by 6 ft. by 6 in. The striking velocity is about 1960 ft.-secs. The attack was with Holtzer's forged steel 6-in. projectiles, weighing 100 lb. each. The striking energy was, therefore, 2665 ft.-tons, and the calculated perforation by Tressider's formula 13·45 in. of iron, giving a relation

Trial of Cammell's Harveyed, nickel steel.

of 2·24 times the thickness of the plate attacked. Five blows were delivered. Figs. 3 and 4 herewith show the front and back of the

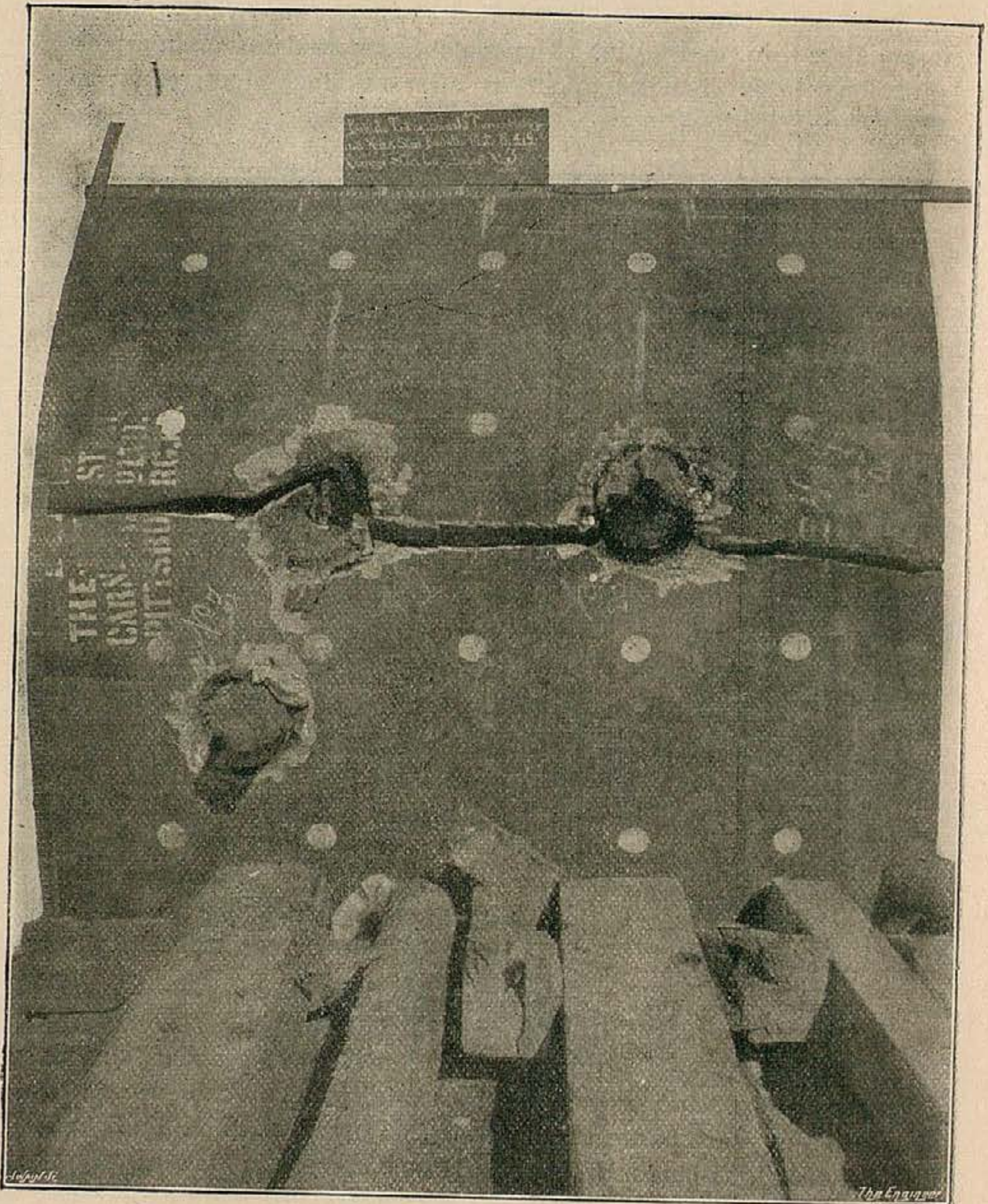


FIG. 2.—CARNEGIE BARBETTE PLATE.

plate at the end of the trial. It will be seen from Fig. 3 that the plate has completely defeated the attack of four blows, the point only getting through in one case, the projectiles having all broken up,

leaving their heads embedded in the plate. There is a certain amount of cracking, as is to be expected, but it will be seen in Fig. 4 that the

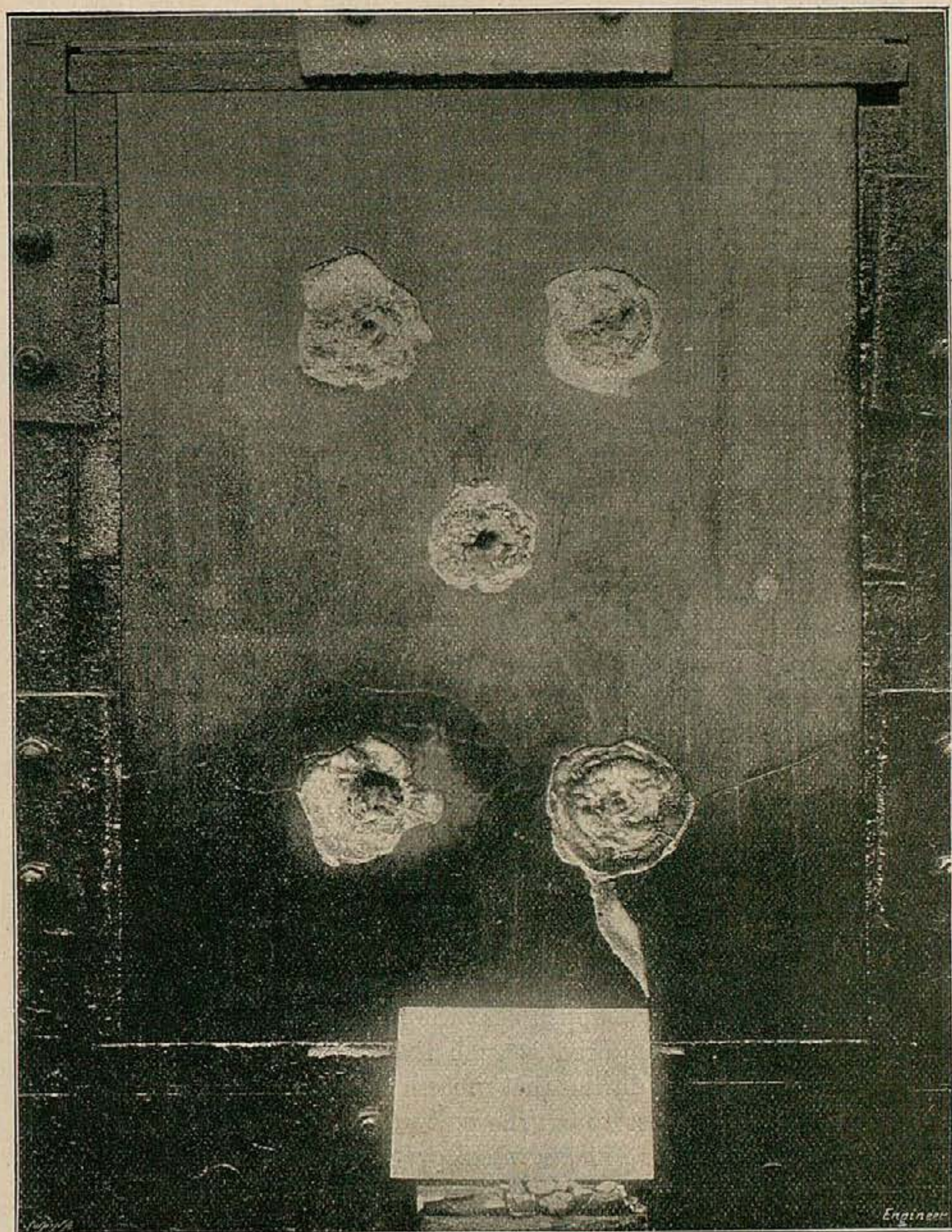


Fig. 3.—Cammell Plate.

back of the plate, though bulged and cracked, compares very favourably with that of a Krupp 5·75-in. plate, which appeared in last year's *Annual*, pp. 356, 357, which had been exposed to attack by 15 and

21-cm. guns (5·9-in. and 8·27-in.) with velocities implying perforation by Tresidder's formula of from 10·2-in. to 13·6-in. of iron—that is, a relation of the actual plate of from 1·77 to 2·35 times its thickness. An intermediate blow, with a perforation of 12·6-in. of iron, or 2·19 times the thickness of the plate, had actually perforated, so that it may be said that Cammell's plate, so far as can be judged, has shown even greater resistance to perforation than the very excellent plate referred to. The back of Cammell's plate shows more cracking, which in plates of this thickness is of less importance than perforation. In March last Brown and Vickers' Harveyed plates, also containing nickel, in the same test broke up all the projectiles without any perforation even at the bulges. Vickers' plate received six blows.

Brown and Vickers' plates.

Local annealing of hard-faced armour.

It is necessary to secure the power of drilling and tapping holes in the face of an armour plate after it is fixed on the ship's side for swivels, fastening of ladders, and the like. To do this with armour whose face is hardened, it is necessary to anneal the spot where the hole is to be made. In England the electric arc has been used successfully for plates containing no nickel, but its failure when nickel is present has been urged as one objection against the employment of this alloy. In the United States the difficulty was overcome by a process projected by the Thomson Electric Welding Company. In this two copper contacts are applied at the spot required to be softened, and an electric current of large volume sent through the portion of plate lying between them, which is brought to a dull red heat. Without describing the special apparatus employed here, it may be said that it is such as can be applied out of doors to the vertical armour of a ship and safely handled. If the current be ceased abruptly, the mass of metal surrounding the heated spot at once chills it completely hard, consequently in the case of an isolated spot for a single hole the current must be gradually decreased. The neatest application of the process is to the case of cutting a gun port in a shield. It may happen that the form and mass of the plate in which the port is required is such that, if the port is made before hardening, the shield during that process cracks in two. Consequently it has been found best to cut the port after hardening. The outline of the port to be cut is annealed by causing the copper contacts to travel slowly along it, annealing it by the current as they go. By this means a strip about 2¼ in. wide has been softened, which could be operated on as easily as before the hardening process.

United States armour-piercing projectiles.

The Wheeler-Sterling Company brought out a pamphlet last year strongly advocating the claims of their projectiles. It may be questioned whether this pamphlet would not do harm rather than good so far as English readers are concerned. It is not pleasant

Wheeler-Sterling.

certainly, to read that "America can beat the world in the manufacture of projectiles," that "Wheeler leads," that "another

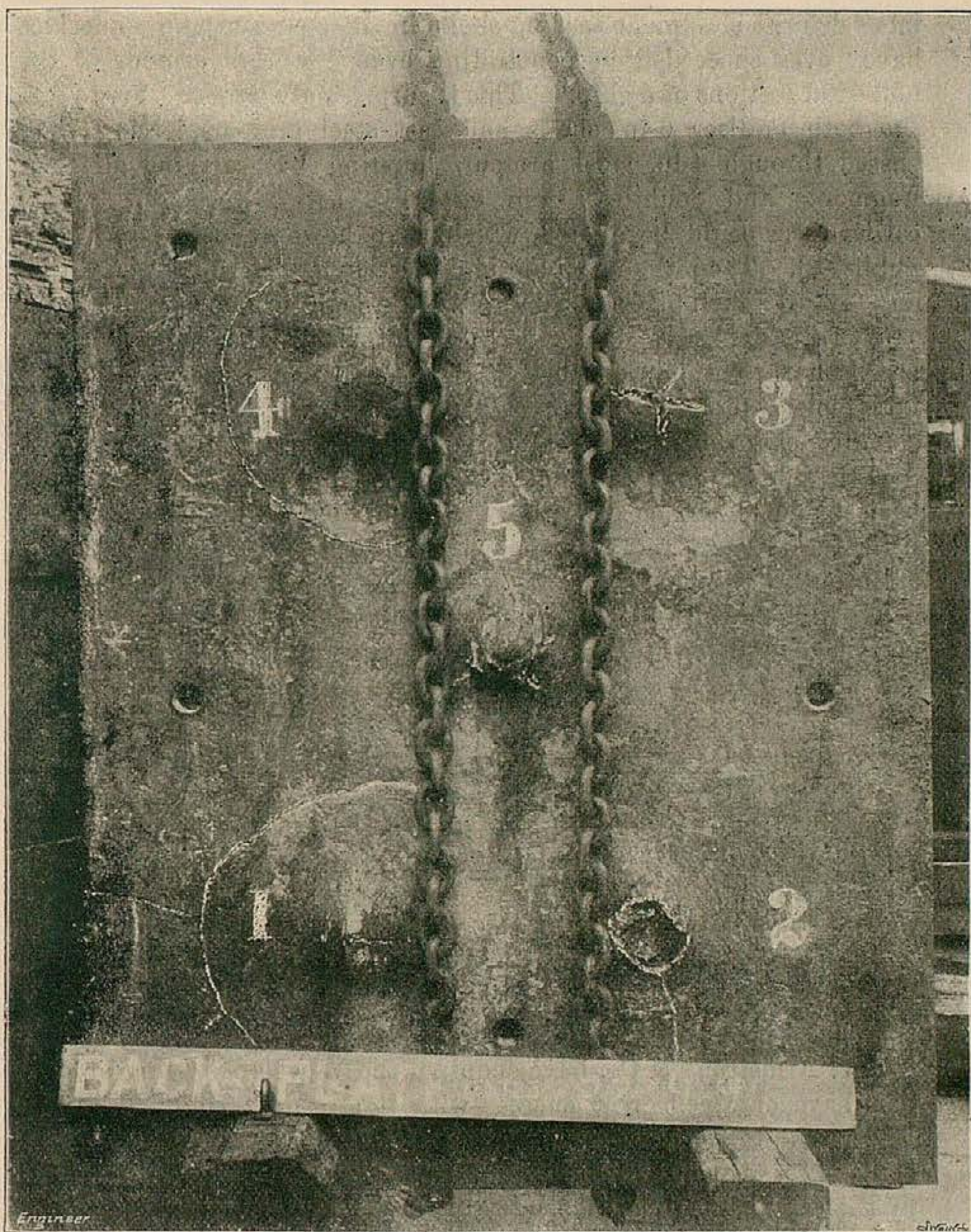


FIG. 4.—BACK OF PLATE.

revolution in the armouring of warships will be brought about by the new Wheeler-Sterling shell," and that "the Sterling Steel

Company has excelled the projectile makers of the world, and is furnishing . . . shells which no armour made in this or any other country can withstand." To these general expressions is added the more definite statement that no shells in the past carrying explosives have "ever succeeded in penetrating even the thin armour of the non-vital sections of a ship." This is surprisingly wrong. Five years ago both Palliser 6-in. shells and cast steel armour-piercing shell passed through 4-in. steel armour, bursting but carrying all their fragments and doubtless their explosive action through. Even earlier cases could be quoted, which have, however, been less widely published. Then the pamphlet in question argues apparently that any empty shell passing unbroken through armour would have carried an explosive charge through it. This is a great mistake, based on the assumption that no shock will fire a charge unless it is sufficient to break up an empty projectile. Had the shell been actually charged and passed through without bursting, it would doubtless have proved that with a suitable fuse it might have been made to act as desired. The pamphlet itself, however, is of little importance, the facts on which it is based are what deserve attention. For example, it is of the highest importance that a 12-in. Wheeler-Sterling shot perforated a 14-in. nickel steel Harveyed plate with 1858 ft.-secs. velocity on 4th February, 1895, the point only being broken. This was mentioned in last year's *Annual*. So far as experiments under the different conditions in various countries can be compared, it appeared to be the best result obtained by any projectile. The boast that no armour can resist the Wheeler-Sterling projectiles is untrue and ill-timed, seeing that hard-faced armour holds its own against the best shot, better than any armour a few years since. It is, however, true that the Wheeler-Sterling had tried it perhaps more severely than any other at the time of the appearance of the pamphlet, and on 28th February a Firth 12-in. shot with 2300 ft.-secs. velocity passed through an 18-in. compound plate, 6 in. of wrought iron, 8 in. of oak, and 3 in. of iron. Sir W. Armstrong & Co. have acquired the Wheeler-Sterling process, and have obtained great success with it already. Hadfield is also understood to have made excellent projectiles.

Firth, Elswick and Hadfield shot.

Caps on shot points.

The best answer to the hard face in armour appears to be furnished by the cap on the shot point. In this probably all the most successful shot makers would agree. Mr. Hadfield, Col. Bainbridge and Mr. Johnson have urged the adoption of caps, and probably others would do so. It has been stated on the best authority that comparative tests of Wheeler and Krupp projectiles have been made in Germany, and that the latter proved themselves fully as good as the former. It is

right to mention this in connection with the fact that such slight indications as could be observed in the shot employed in the trials of

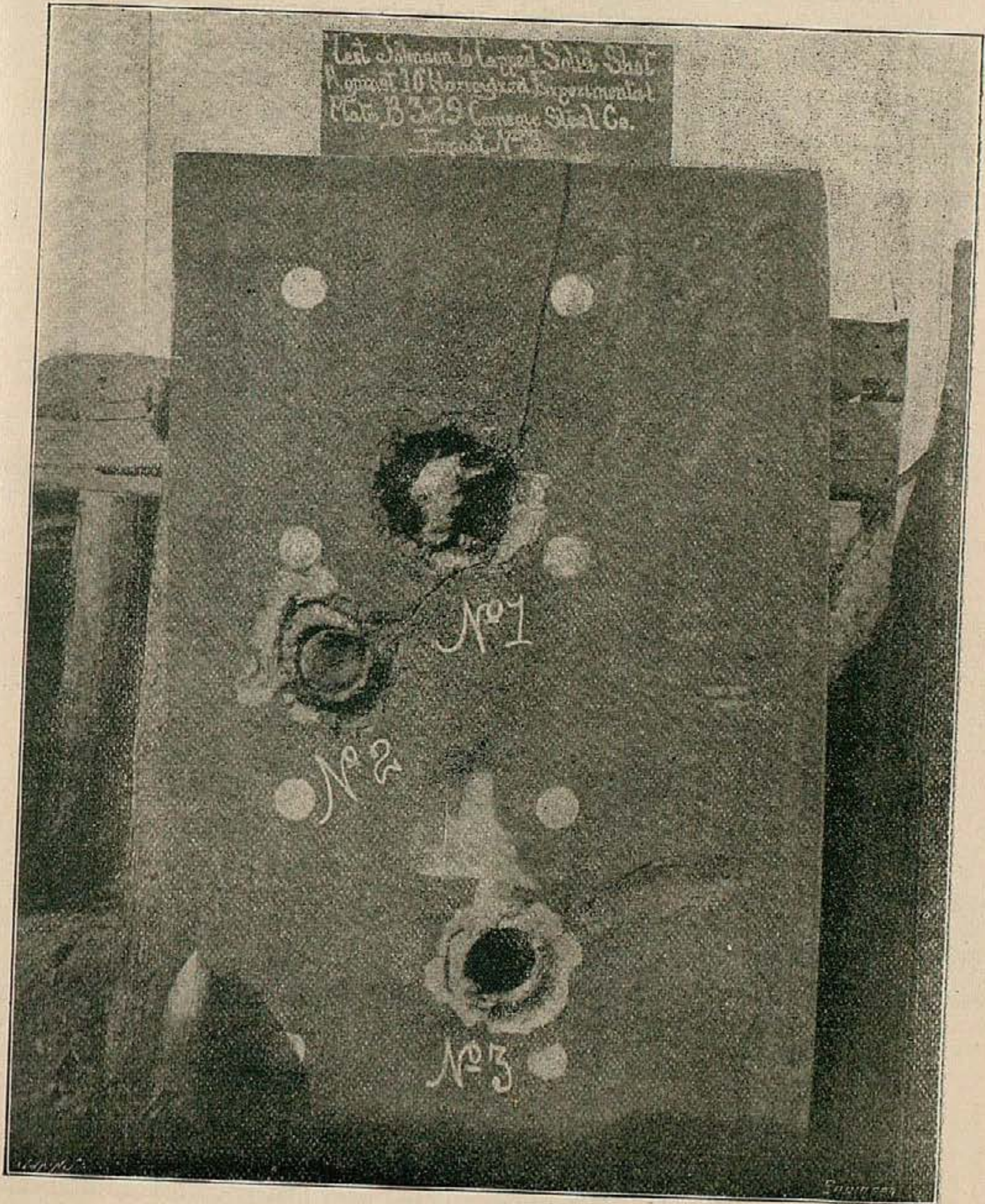


FIG. 5.

Krupp plates given in last year's *Annual* were thought to suggest that the particular projectiles employed were rather soft.

Johnson's capped shot.

Steel shot made by a process worked out by Isaac G. Johnson, of Spuyten Deeyvil, have given remarkable results. Johnson shot owes its power to three properties—(1) Special quality and treatment of steel; (2) to its being solid; (3) to its having a cap on its point. On 30th April, 1896, a capped 6-in. 100-lb. shot passed through a 7-in. reforged Harveyed Carnegie plate, the shot being deformed to the extent shown in Fig. 6, which is the reproduction of a photograph of the recovered projectile. On 10th September, 1896, a Johnson 6-in. shot was fired at a similar plate 10 in. thick. The first,

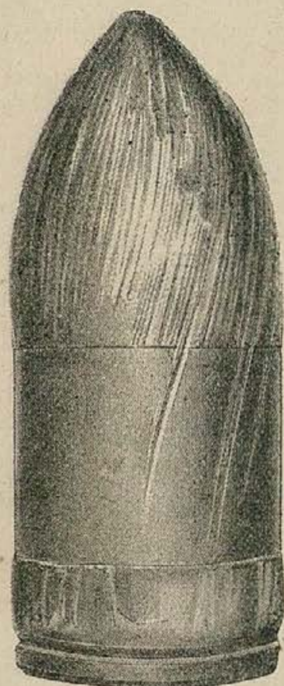


Fig. 6.

weighing 100 lb., was fired with a velocity of 2100 ft.-secs. This penetrated to a depth of 8 in., and broke across. See No. 2 point of impact in plate, shown in Fig. 5. The second shot, weighing 105·25 lb., was fired with a velocity of 2505 ft.-secs., and passed entirely through the plate and backing of 12 in. of oak and three $\frac{7}{16}$ in. plates, and buried itself 8 ft. in the sand behind. See point of impact No. 3. The upper point of impact No. 1 shows the head of an 8-in. Holtzer shot lodged in the plate. This projectile, weighing 250 lb., struck with a velocity of 1800 ft.-secs., and broke, leaving its head thus embedded. The calculated perforation through iron of the second Johnson shot is 19·9 in., by Tresidder's formula.

This would be a very severe test for a 10-in. forged iron plate, but the extraordinary behaviour of the shot is its perforation of a hard-faced, double-forged plate without more injury than the fracture of the base, half of which, extending up to the band score, was broken off. The form of the cap is shown in the figure of the unfired shot. It is made of soft steel.

Fig. 7 shows the Johnson shot with the cap on its point, and the projectile recovered after impact. The fractured state of the base is not seen, being turned away.

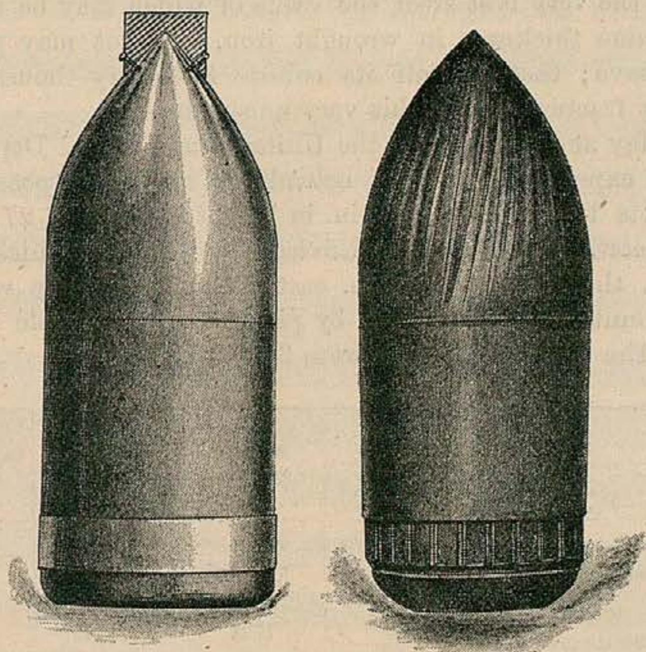


FIG. 7.

In last year's *Annual* it was shown by a table of results that the formula put forward by Capt. Tressider for perforation gives the same results practically as that long employed by Krupp. For projectiles of the same proportion and sectional density, it will be found that the two formulæ become *absolutely identical*, so that the comparison of results obtained in England and Germany becomes simplified. In an article by Capt. J. Castner in *Stahl und Eisen*, of 1st April, 1896, a new formula for the best hard-faced plates is given as first laid down at the Krupp works, which curiously enough is exactly the old Fairbairn formula on which our British rule of thumb is based. This rule was most correct for a striking velocity of about 2000 ft.-secs. and a sectional density such that $\frac{w}{d^3} = 0{\cdot}41$.* Shot are not much

Formulæ for the perforation of armour.

* Where w = weight of shot in lbs., and d its diameter or calibre in inches.

heavier now. The six first armour-piercing shot from a table of Krupp's give this function 0·42, and the thirteen first from a British table 0·45. It appears then that circumstances may arise when the rule of thumb may give as accurate results as any formula. The developments of recent years do not, therefore, detract from the value of the rule of thumb for a rough estimate. It may be said that a shot under favourable circumstances may perforate about one calibre of wrought-iron armour for every thousand feet velocity; namely, one calibre for 1000 ft.-secs., one and a half calibres for 1500, and so on. For the very best steel, the value of which may be equal to twice the same thickness in wrought iron, the shot may perforate half the above; that is, half its calibre for every thousand feet velocity, but fracture makes this very uncertain.

Attack of a turret target.

During May and June, 1896, the United States Naval Department fired at an experimental turret resembling as far as possible the Massachusetts turret, 10 ft. 10½ in. in height inside, and 27 ft. 3 in. inside diameter. The structure carried one Harveyed nickel steel plate 15 in. thick and ten 15-in. cast-iron plates. The weight of guns and mounts was represented by pig iron. The whole weighed 450 tons. The following rounds were fired :—

Round.	Projectile.		Striking velocity.	Striking energy.	Energy per ton of turret.
	Nature.	Weight in lbs.			
			ft.-secs.	ft.-tons.	
1	Wheeler-Sterling 10-in	500	1683	9,829	21·84
2	Wheeler-Sterling 12-in	850	1701	17,069	37·95
3	Johnson capped 12-in.	850	2000	23,626	52·5

The first two shots broke with penetrations of 9½ and 11½ inches respectively. The third perforated but broke up, wrecking the rear part of the turret, which, however, was not deformed. The turret moved 9¼ in. on the rollers, but these were not flanged as on board ship, and it was thought that an actual turret on board ship would have adequately held its ground.

It has been apparent for many years at Shoeburyness and other trial grounds that hard-faced steel shields spring in the ground much more than those of wrought iron. Information on this question is therefore welcome. In relation to attack by very heavy ordnance, it needs specially to be kept in view.

BRITISH M.L GUNS.

PERFORATIONS

Gun	Racking Power Muzzle Energy Foot Tons
7 IN IV 7 TONS	1943
8 IN III 9 TONS	2398
9 IN V 12 TONS	3681
10 IN II 18 TONS	5408
11 IN II 25 TONS	7028
12 IN II 25 TONS	7190
12 ½ IN II 38 TONS	14070
16 IN I 80 TONS	27960
17·72 IN I 100 TONS	33220

Thickness of front plate in inches steel	Equivalent of steel & backing in wrought iron	French	Italian	German	Russian
21·5	28	A Baudin	Duilio		
19·8	25·7	Caiman	Italia		
18·1	23·6		Doria		
17·8	23·2	Hoche, Furieux, Ch. Martel, Bouvines			
17·4	22·5	A. Duperre			
15·8	20·7	Brennus	Sardinia	Baden, Brandenburg	Catherine II
14·2	18·8	Tonnant			Alexander II
12·6	16·7			Oldenburg	
12·0	16·0	Courbet			
11·2	15	Redoutable			
10·4	14	Fulminant			A. Nachimoff
8	11	Bayard, Acheron		Deutschland	
7	9·8				
6·8	9·5	Belier, Friedland			
6·2	8·7				

Maximum ranges of perforation (yards) marked on the chart, by plate (thickness of front plate in inches steel):

Gun	18·1	17·8	17·4	15·8	14·2	12·6	12·0	11·2	10·4	8	7	6·8	6·2
11 IN II 25 TONS									100	2600			
9 IN V 12 TONS										200	1000	1200	1800
10 IN II 18 TONS										1500	2700		
8 IN III 9 TONS												100	600
12 IN II 25 TONS										2000			
12 ½ IN II 38 TONS					380	1615	2150	2560					
16 IN I 80 TONS	350	600	850	2100									
17·72 IN I 100 TONS	790	1030	1420	2550									

THICKNESS OF FRONT PLATE IN INCHES STEEL
EQUIVALENT OF STEEL & BACKING IN WROUGHT IRON

VESSELS CARRYING ARMOUR NEARLY EQUIVALENT TO SECTIONS SHOWN ABOVE THEIR NAMES

A HOLE WITHOUT FIGURES MEANS PERFORATION UP TO 3000 YARDS. MAXIMUM RANGES OF PERFORATION LESS THAN 3000 YARDS ARE MARKED IN FIGURES.

SCALE–20 FEET TO AN INCH. SHADED GUNS ARE CORRECT IN GENERAL OUTLINE.

ALL BACKING IS 18 IN. OF WOOD WITH 1½ IN. SKIN.

NOTE THE 29 TON 10 IN. GUN PERFORATES THE 18·8 IN IRON (TONNANT) SHIELD AT 1800 YDS. & ALL THINNER SHIELDS AT ALL RANGES

† THIS GUN IS TAKEN FROM ELSWICK Q.F. GUN TABLE.

BRITISH B.L. GUNS

PERFORATION

Gun	Racking-power muzzle energy foot tons
† Q.F. 6 IN. VI 6·5 TONS	4333
8 IN. VI 14 TONS	6730
9·2 IN VI 25 TONS (WIRE 35 ††)	14520
12 IN VII 45 TONS	18130
13 5 IN 67 TONS	35230
16 25 IN. 111 TONS	54390

The 12-IN-VIII-WIRE has still greater perforation

NOT QUITE AT MUZZLE

1100 · 460 · 2350 · 1050 · 1160 · 1370 · 2000 · 950 · 2670 · 2000 · 500 · 950 · 1400

Thickness of front plate in inches steel	21·5	19·8	18·1	17·8	17·4	15·8	14·2	12·6	12·0	11·2	10·4	8	7	6·8	6·2
Equivalent of steel & backing in wrought iron	28	25·7	23·6	23·2	22·5	20·7	18·8	16·7	16·0	15	14	11	9·8	9·5	8·7
French	A.BAUDIN	CAIMAN		HOCHE, FURIEUX, CH. MARTEL, BOUVINES	A.DUPERRÉ	BRENNUS	TONNANT		COURBET	REDOUT-ABLE	FULMI-NANT	BAYARD, ACHERON		BELIER, FRIEDLAND	
Italian	DUILIO	ITALIA	DORIA			SARDINIA									
German						BADEN, BRANDEN-BURG		OLDENBURG				DEUTSCH-LAND			
Russian						CATHER-INE II	ALEX-ANDER II				A.NACHI-MOFF				

Vessels carrying armour nearly equivalent to sections shown above their names

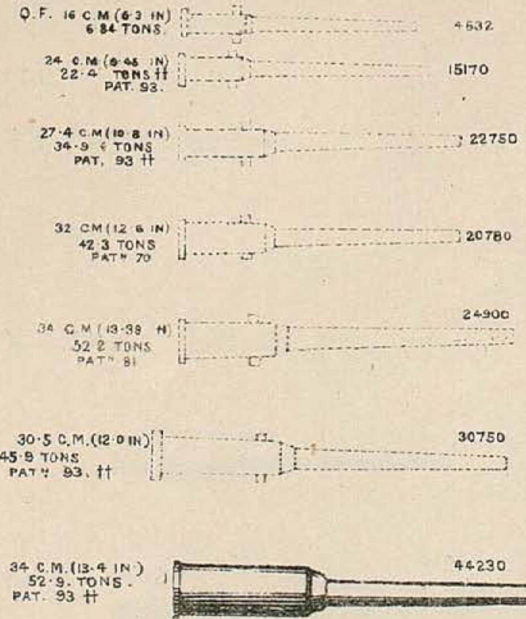
A HOLE WITHOUT FIGURES MEANS PERFORATION UP TO 3000 YARDS. MAXIMUM RANGES OF PERFORATION LESS THAN 3000 YARDS ARE MARKED IN FIGURES

SCALE–20 FEET TO AN INCH. SHADED GUNS ARE CORRECT IN GENERAL OUTLINE

ALL BACKING IS 18 IN OF WOOD WITH 1½ IN SKIN

NOTE THE 29 TON 10 IN. GUN PERFORATES THE 18·8 IN IRON (TONNANT) SHIELD AT 1800 YDS & ALL THINNER SHIELDS AT ALL RANGES

† THIS GUN IS TAKEN FROM ELSWICK Q.F. GUN TABLE. *†† PERFORATIONS CALCULATED BY TRESIDDERS–FORMULA*



PERFORATIONS

Thickness of front plate in inches steel	21·5	19·8	18·1	17·8	17·4	15·8	14·2	12·6	12·0	11·2	10·4	8	7	6·8	6·2
Equivalent of steel & backing in wrought iron	28	25·7	23·6	23·2	22·5	20·7	18·8	16·7	16·0	15	14	11	9·8	9·5	8·7
Perforation figures (top to bottom)	330, 1230, 2020	520, 1760, 300, 2615	1270, 2415, 465, 1000	1360, 2630, 600, 1150	1550, 765, 1420	2000, 1490, 2035	115, 2550, 2181, 2090	615	730	1065	1865	2350	2955		
French	A. Baudin	Caiman		Hoche, Furieux, Ch. Martel, Bouvines	A. Duperré	Brennus	Tonnant		Courbet	Redoutable	Fulminant	Bayard, Acheron		Belier, Friedland	
Italian	Duilio	Italia	Doria			Sardinia									
German						Baden, Brandenburg		Oldenburg				Deutschland			
Russian						Catherine II	Alexander II				A. Nachimoff				

VESSELS CARRYING ARMOUR NEARLY EQUIVALENT TO SECTIONS SHOWN ABOVE THEIR NAMES

A HOLE WITHOUT FIGURES MEANS PERFORATION UP TO 3000 YARDS, MAXIMUM RANGES OF PERFORATION LESS THAN 3000 YARDS ARE MARKED IN FIGURES.

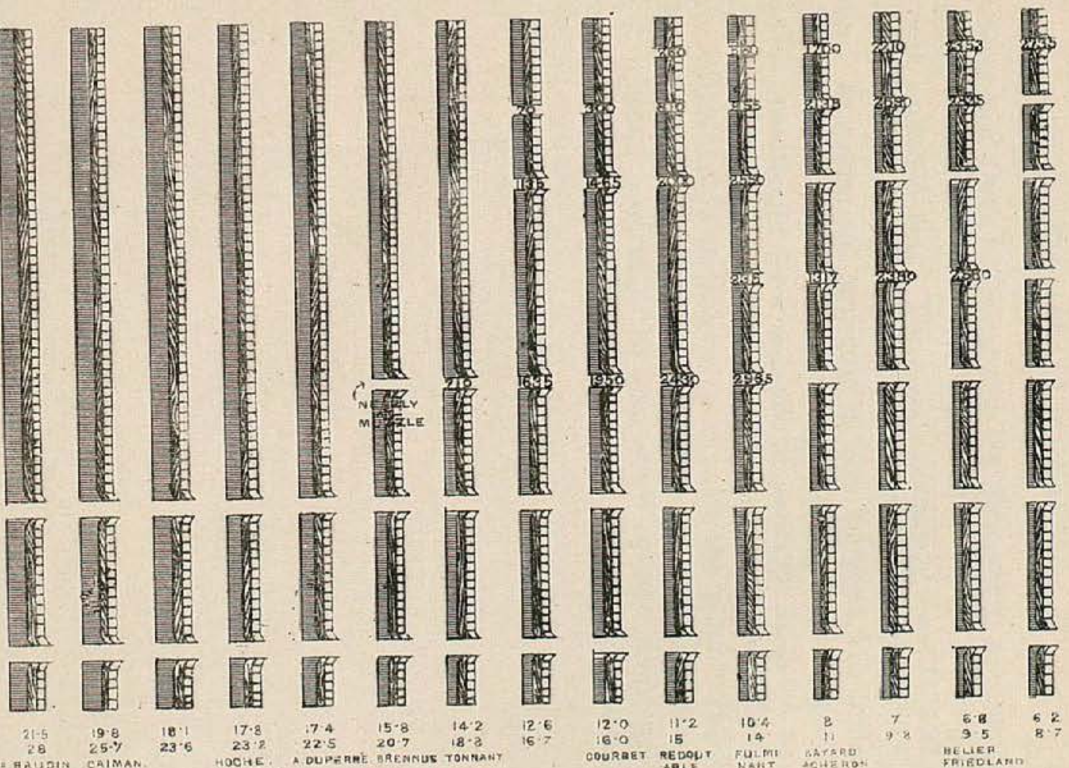
SCALE–20 FEET TO AN INCH.

SHADED GUNS ARE CORRECT IN GENERAL OUTLINE.

ALL BACKING IS 18 IN. OF WOOD WITH 1½ IN. SKIN.

†† PERFORATIONS CALCULATED BY TRESIDDERS FOMULA.

GERMAN GUNS



A HOLE WITHOUT FIGURES MEANS PERFORATION UP TO 3000 YARDS, MAXIMUM RANGES OF PERFORATION LESS THAN 3000 YARDS ARE MARKED IN FIGURES.

SCALE-20 FEET TO AN INCH.

SHADED GUNS ARE CORRECT IN GENERAL OUTLINE.

ALL BACKING IS 18 IN. OF WOOD WITH 1½ IN SKIN.

† TAKEN FROM KRUPP Q.F. GUN TABLE.

‡ TAKEN FROM KRUPP ORDNANCE AT CHICAGO.

In November, 1896, at Ochta, near St. Petersburg, an 8-in. gun of 45 calibres is said to have driven a projectile through a 10-in. Krupp plate with hardened face. The striking velocity was 2850 ft.-secs., and the projectile emerged at the back of the plate with 700 ft.-secs. velocity. Supposing the projectile to have weighed 192·3 lbs., this would imply that an amount of energy was expended in perforating this plate that would have sufficed to perforate 27 in. of iron. If the shot weight was 172 lbs., then sufficient energy to perforate 25·5 in. was taken out of it in passing through the plate. This means that the Krupp plate was shown to be a very good one in the resistance it opposed, and that the shot stood up admirably under the unusually high velocity of impact—a velocity which gives this trial special importance.

Ochta plate trial at high velocity.

CHAPTER II.

Ordnance.

This year there have been few new British guns introduced. The most striking is a very long coast gun of 9·2-in. calibre and a length of 46·7 calibres, which is interesting rather as resembling possible foreign coast guns than from any importance it possesses for our Navy. The only other pieces are 6-in. and 4-in. pieces of 5 tons and 26 cwt. respectively, which are converted to quick-fire guns by alteration of their breech fittings. The conversion of these pieces, for which a long time ago a design was submitted by Elswick, is an important matter, and adds greatly to the efficiency of our secondary armaments, although the pieces, replaced as they are on their former mountings, may be regarded as quick-loaders rather than quick-firers, seeing that, while the actual quick-loading is provided for, two essentials in quick-firing remain deficient, namely, the provision for the gun's recoil and recovery without serious disturbance of aim, and also the "pointer" or "number one" being able to keep his eye on the sights while the gun is loaded; this last necessitates the sights being fixed on a portion of the carriage which does not recoil.* These advantages depend on the mounting, and are not, therefore, found in the carriages on which our converted quick-fire guns are replaced; but, on the other hand, they are not found in a great number of foreign quick-fire guns, so that the deficiency does not entail our being behind our neighbours, though it is clear that, with all these carriages falling short of our requirements, we ought to make no more ordinary carriages for 6-in. guns at the moment, but take them from the Navy, giving them quick-fire carriages instead.

Howitzers have during the last few years again been brought in, and are badly needed for certain classes of work. Nothing more opposite in character to a howitzer can well be conceived than a gun of small bore discharging an armour-piercing projectile with a very high velocity and flat trajectory. Consequently, where shells with high-explosive power are required to search behind cover, howitzers

* *See* Fig. 4, p. 345.

Authorities: The *Engineer* for plates and matter; Engineering 'Proceedings of United Service Institution'; 'Journal of United States Artillery'; the *Times*; Elswick; M. Canet; Herr Krupp; and information published from Royal Arsenal.

are more than ever necessary. Even on board ship they might be needed at times. At short ranges, they would be very valuable fired against the unarmoured parts of an enemy, and for ships attacking coast works they are the only pieces to touch guns mounted with any considerable command above the sea. For coaling stations and other coast positions, vertical fire is valuable to prevent an enemy from anchoring, because experience shows that this prevents her developing anything like her full powers of attack. We have now 6-in., 5·4-in., and 5-in. breech-loading howitzers, and in the judgment of some larger ones would be valuable occasionally.

Main armament guns.

As to our regular main armament guns, the patterns already introduced have given very good results, so that the principal object of our authorities lately has been to complete the supply of guns made on our latest patterns rather than to look for new designs. Large orders for ordnance, including the 12-in. wire gun, have gone to private firms, that is, to Elswick, Whitworth, and Vickers. The two first-mentioned firms have now united. Each has made a world-wide reputation, and the two constitute a gigantic establishment, with a capital of over five millions and a quarter. Messrs. Vickers have bought the business of the Naval Construction and Armaments Company, of Barrow, and will be in a position to turn out armour-clad ships complete with all their guns, equipment, armour, and engines. Messrs. Schneider have this year united with their establishment that of the Société Anonyme des Forges et Chantiers de la Méditerranée, with which M. Canet is identified. Many years ago Elswick took in the firms of Mitchell and the works of Vavasseur, and Krupp more recently combined with Gruson, so that the great manufacturing establishments of war material have united to a remarkable extent.

Supposing the guns of most Powers to have at length taken a more definite shape than for some years past, it may be interesting to draw some comparisons. The introduction of the wire system ought to enable English guns to bear a greater strain than others, so that more work might be safely got out of a wire gun than a solid or hooped steel piece. The measure of this is the energy obtained per ton of gun. This is not the sole point to consider in light guns, in which occasionally weight is given not for strength so much as to enable the recoil to be controlled easily. In heavy guns, however, the measure first adopted by Krupp seems sound and reasonable, that is, to treat the weight of metal as the capital furnished and the muzzle energy as the result obtained. If this test be applied to the British, French, German and United States 12-in. guns, we get the following results. The German gun is a light and old-fashioned piece, and

compared with the new type guns almost a howitzer, so that under it is added a more powerful 11-in. gun, which is more nearly the same weight as the 12-in. guns of other nations, but cannot really do justice to German ordnance.

Nation.	Calibre.	Weight of Gun.	Length of bore in Calibres.	Weight of Shot.	Muzzle Velocity.	Muzzle Energy.	Energy per ton of Gun.
	ins.	tons.		lbs.	ft.-secs.	ft.-tons.	
British (wire) .	12	46	35·4	850	2,367	33,020	718
French . . .	12	45·9	40	643·8	2,625	30,750	670
German. . .	12	35·4	18·9	725·3	1,713	14,750	417
„	11·02	43·4	40	562	2,362	21,750	501
United States. .	12	45·2	35·0	850	2,100	25,985	575

Looking at this table, it is seen that the British gun hits much the hardest blow, and gives the greatest energy in proportion to its weight. We may dismiss the German 12-in. at once—indeed, it is only entered to show why the 11-in. must be taken. The British and United States projectiles are of the same weight, and much heavier than those of France and Germany. The guns are evidently constructed with the same object and ideas, the difference being that the British gun is slightly heavier and longer, and, being of wire construction, it is capable of bearing a higher pressure safely. What difference there may be in this respect cannot be said, pressures not being furnished; but it may be anticipated that, should wire be adopted by the United States, a 12-in. wire gun may appear very closely agreeing with our own. The French gun is a remarkable piece, standing second in order both as to total muzzle energy and energy per ton of gun. The muzzle velocity is very high. In fact, this gun appears for the first time in the *Annual*, and it may be questioned whether the velocity may not come down a little eventually. This has occurred in the case of our own 12-in. wire gun this year, and in the case of certain French guns two years ago. The whole of the first new French guns have the same muzzle velocity assigned to them, namely, 800 metres, which must, therefore, be taken as an estimate probably nearly justified, but not as an actual measured result. This rather argues an early stage in the history of the gun, but unless great deductions are made the piece is a very good one. The German gun does not compare well for this particular calibre. It would be interesting to add a Russian gun, but it would only be misleading to take the 30-calibre gun, and it may be observed

that the muzzle velocity of the 35-calibre gun is not known; the weight of the projectile (626·4 lbs.) most nearly approaches that of the French shot.

To these guns made in Government factories may be added one recently made at Elswick for Japan, of which the following table shows the ballistic results. This piece, it will be seen, closely resembles the English and American guns in many respects, but it is heavier and more powerful. Its perforation at the muzzle, worked out by Krupp's formula, is 39·1 in. of iron. This is the highest result for any gun hitherto made, even including all those pieces which weigh over 100 tons. This is the gun whose remarkable shooting is given on p. 356. It is wire-wound, and the most powerful armour-piercing gun afloat. Its rate of fire is one round per 80 secs. It would, therefore, on coming into action loaded, deliver three rounds in 2 min. 40 secs. **Elswick 12-in. gun for Japan.**

ELSWICK 12-IN. B.-L. GUN.

Diameter of bore	12 ins.
" "	304·8 mm.
Length of bore	40 calibres.
" gun	41·7 calibres.
Weight of gun	48·85 tons.
" projectile	850 lbs.
" charge	145 lbs.
Muzzle velocity	2,423 ft.-secs.
Velocity at 2,500 yds.	2,015 ft.-secs.
Muzzle energy	34,608 ft.-tons.
Energy at 2,500 yds.	23,931 ft.-tons.

To pass on to another calibre where wire guns exist, namely, 9·2-in. The nearest corresponding calibre in centimetres is 24 (or 9·45-in.). The following table shows a comparison between British, French, and German guns. The United States have no corresponding calibre.

NATION.	Calibre in ins.	Weight of gun in tons.	Length of gun in calibres.	Weight of shot in lbs.	Muzzle velocity ft.secs.	Muzzle energy. ft.-tons.	Energy per ton of gun. ft.-tons.	Perforation through iron in ins. at muzzle.	2,000 yds.	3,000 yds.
British (wire)	9·2	25	40	380	2,347	14,520	581	27·6	20·7	18·0
French . .	9·45	22·4	40	317·5	2,625	15,170	677	29·4	20·6	17·2
German . .	9·45	25·4	40	474	2,067	14,050	553	26·8	20·0	17·7

It will be seen here that the French gun stands first in total energy and in energy per ton of gun, but its projectile being lighter it drops second in perforation at 2000 yards and last at 3000 yards. This gun, however, is the lightest gun of the three, and shows a

very good result if realised. The same remarks, however, apply to it as to the 12-in., that it is a new gun with an estimated and probably rather over-estimated velocity. The British gun here appears to be anything but a good representative of a wire gun. With the 12-in. gun commanding an energy per ton of gun of 718 ft.-tons the 9·2-in. shows very poorly with only 581 ft.-tons per ton. There is something, however, mysterious about the weight of this gun. In Naval lists it is given as 23 tons, and it is reported that this is its actual weight, which would make its energy 631 ft.-tons. This is better, but still not what would be expected, and inferior to the French piece. Probably the weight given in the Official List will be changed before very long. The long wire 9·2-in. coast-gun, as may be seen in the British list of ordnance, has an estimated muzzle velocity of 2700 ft.-secs. and an energy of 19,220 ft.-tons, its weight being 27 tons. This implies an energy per ton of 712 ft.-tons. Considering its length, this is a very inferior result to that of the 12-in. gun. In concluding this imperfect comparison, it may be observed that the pressures obtained in the bores would enable us to judge much better of the value of the guns. Without them, the apparent excellence of a gun may be increased by the audacity of the maker in diminishing its margin of safety.

The following occurrences connected with ordnance may be noted:—

Remarkable shooting of Elswick 12-in. wire gun.

A remarkable feat in accurate shooting was achieved in February, 1897, by a 12-in. wire gun made by Elswick for Japan. Three projectiles were fired with a charge whose weight was three-quarters that of the shot. At a range of 5000 yards all fell within a rectangle measuring 4 yards by 2 yards.

Pneumatic dynamite guns at San Francisco.

A powerful battery of pneumatic dynamite guns has been established at San Francisco on a new design of an inventor named Rix. The guns weigh 70 tons each, and are 50 ft. long with 15-in. bores, firing projectiles of calibres varying from 8 in. to 15 in., the smaller calibres being made to fit the bore by means of wood sections which escape from the projectile after it leaves the muzzle. The projectiles vary in length from 11 ft. for the 15-in., and 8 ft. for the 8-in. calibre. The guns traverse through 360 degrees, and have elevation provided up to 35 degrees, given by an electric motor. A range of 5000 yards has been obtained with the 8-in., and of 2500 yards with the 15-in. projectile. The firing is said to be accurate. The shells are charged with "nitrogelatin," consisting chiefly of nitroglycerine and guncotton. The shell has mechanism devised to explode the charge from one to three seconds after impact. The 15-in. shell threw up a column of water from 350 to 400 ft. high and 100 ft. in diameter

which it was believed would destroy the largest man-of-war within an area of 100 ft. square.

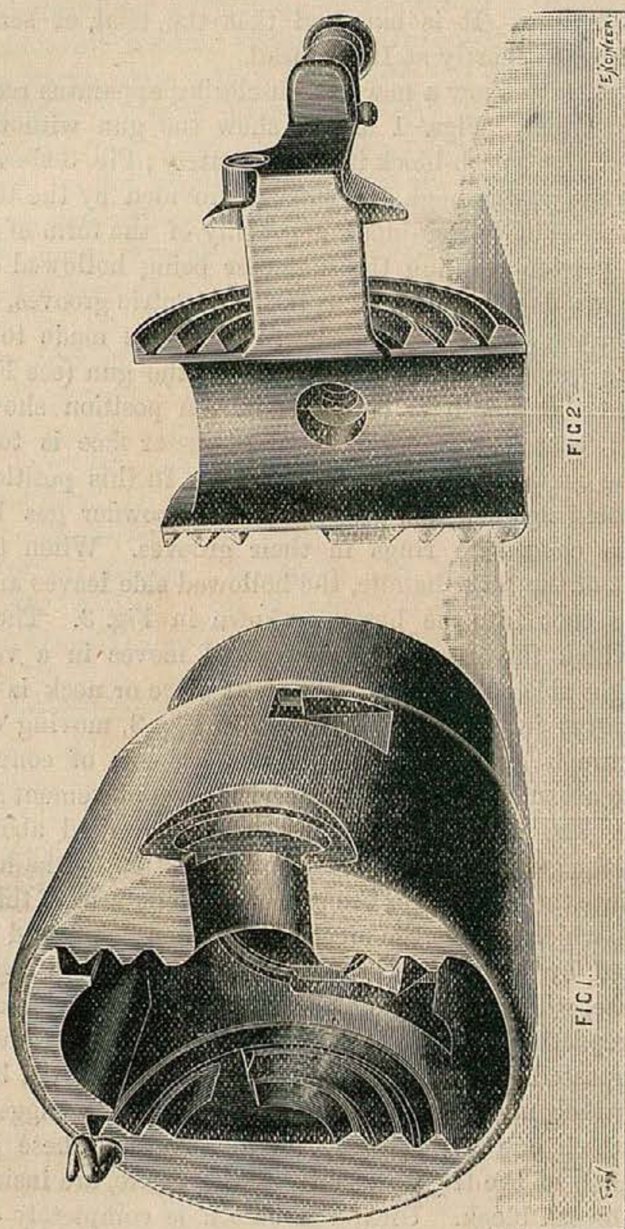
High explosives in heavy U.S. ordnance.

A 12-in. rifled gun has been constructed at Washington for trial with high explosives. The piece is actually a 13-in. gun bored out only to 12-ins. calibre. It is expected that the trial, or series of trials, may commence shortly at Indianhead.

Canet's concentric ring breech piece.

The figures herewith show a new breech-closing apparatus recently brought out by Canet. Figs. 1 and 2 show the gun without the breech-block and the breech-block itself separately; Fig. 3 shows the charge entering the gun through the passage provided by the breech-block when open. The breech-block is roughly of the form of a half cheese, the cut portion forming the diameter being hollowed out as shown, and the two flat faces being cut into concentric grooves, either triangular as in the figure or square cut. These are made to move in corresponding grooves cut in the breech of the gun (see Fig. 1). The block when the breech is closed is in the position shown in Figs. 2 and 3; that is, the hollowed or diameter face is towards the rear and the curved face towards the bore. In this position the block is supported against the pressure of the powder gas by the bearings of the concentric rings in their grooves. When turned round by means of the lever handle, the hollowed side leaves an open passage for the shot into the bore, as shown in Fig. 3. The long lever arm by which the breech piece is worked moves in a vertical plane on the right side of the gun. The short piece or neck is a half cylinder, and moves in the recess, as shown in Fig. 3, moving on an axis passing through the centres of the two systems of concentric grooves, so as to accomplish the opening and closing movement shown in the figures. The extent of the movement is limited above by contact against the gun, and in the backward direction by the head of a screw fitting into the lever. On the end of the long arm of the lever is a locking bolt, which secures the breech piece when it is forced home. Firing is effected by percussion or electricity, or by both together. In the first case, which is that of the example here depicted, the mechanism is repeating; that is to say, it provides for the same tube being struck repeatedly without altering the position of the breech. It contains a striker, moved by a V-spring, acted on by a trigger with two arms, of which one carries a ring for a lanyard. These pieces, except one branch of the trigger visible in the figure, are inside the interior of the breech block. Until the breech is completely closed, the trigger is immovable, and premature firing impossible. The ejection of the fired cases is effected by an extractor with four branches fixed in the breech of the gun. It is actuated by the breech piece itself, which presses the counter-levers at the end of its move-

ment in opening with all its weight. To open the breech, it is enough to touch the handle of the breech piece, to disengage the safety tooth, and then leave it alone. The centre of gravity of the breech-block



DETAILS BREECH PIECE REMOVED.

is situated beyond its axis of rotation, and the breech opens automatically by its weight alone. This movement is very rapid, for the block only describes an angle of 90 degrees to open the bore com-

pletely. On this movement, the half cylinder takes a position with its diameter horizontal (see Fig. 3), the hollowed face being in prolongation of the chamber of the gun, and forming a carrier for the entrance of the rear charge in loading. This is a great advantage in rapid firing; it also facilitates the ejection of the fired case by the extractor. To close the breech, it is sufficient to force the lever in the opposite direction until the safety tooth or catch goes home, and secures the breech in its closed position.

Not reckoning the breech-block, the mechanism consists of five

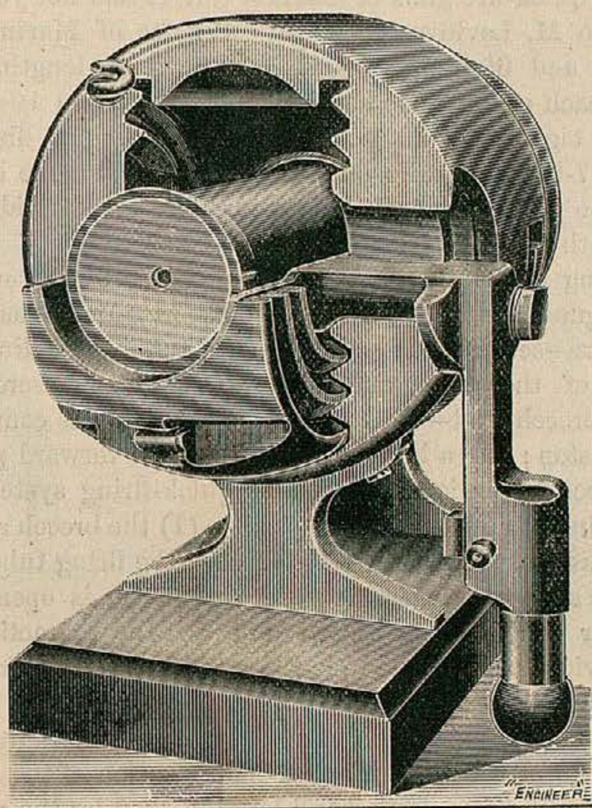


FIG. 3.

pieces in all. It can be taken to pieces or assembled by hand in an instant. It is sufficient, in fact, to disengage the holding screw, and move the breech-block lever through 180 degrees. The block is then entirely free from the gun, and it is easy to replace either an extractor or any other piece.

In conclusion, the important properties of this breech action may be thus summed up:—(1) Very swift and easy working by means of a single short lever stroke. (2) Automatic opening without special mechanism. (3) Instant mounting and dismounting by hand.

(4) Absolute safety. (5) Absence of all encumbrances in rear of the breech. (6) Complete protection to the working pieces of the breech. (7) Reduction of parts to four in the case of electric firing, five in the case of firing by percussion. Supposing the substance of the breech-block to be sufficient to give the necessary strength, the neatness and simplicity of this breech piece must commend itself.

New Canet Q.-F. guns supplied to Greek Navy.

The Greek armoured vessels Hydra, Spetzia, and Psara were built in 1888–9 by the Société des Forges et Chantiers. Each ship was armed with three 27-cm. (10·6-in.) and three 15-cm. (5·9-in.) guns. At that time quick-fire guns of medium calibre had not yet come in. Two years ago M. Levidis, the Greek Minister of Marine, ordered Canet 10-cm. and 65-mm. guns of fifty calibres length. It was decided that each of the three ships should receive one 10-cm., firing forward, and eight 65-mm. guns. The 10-cm. gun discharges a 13-kilos. (28·7-lb.) projectile, and the 65-mm. gun one of 4 kilos. (8·8 lb.). The projectiles are attached to their brass cartridges, which are charged with smokeless powder.

The following description has been furnished of the mountings. The 10-cm. guns are all of identical pattern, and consist of the following parts—see Fig. 4:—(1) A gun tube extending for the entire length of the piece, and carrying the breech screw; (2) a jacket on the breech end—H H in figure—to which is connected the recoil brake piston; (3) a hoop strengthening the forward part of the gun. The breech gear is of the Canet quick-firing system, and is worked by a single motion. It comprises—(1) the breech screw with interrupted threads, pierced in its centre by the firing tube; (2) the bracket which supports the screw while the breech is open; (3) the mechanism for working the breech and for the extraction of the cartridge, providing by the simple movement of a lever from left to right the following successive movements—the rotation of the screw, the withdrawal with extraction of cartridge, and the rotation round the vertical axis of the bracket, with final ejection of the cartridge; (4) the firing mechanism, with hand lever worked by the pointer, or "No. 1," and the safety gear.

The mounting for the 10-cm. gun consists of the following parts: (1) the carriage proper, consisting of a tube A A enclosing the breech portion of the gun, acting as a cradle, and carrying near its front trunnions B, on which the whole system revolves for elevation. The recoil cylinders C are fixed running along beneath it, while above it lie a recuperator with springs independent of the recoil cylinder, which provide for the automatic running up of the gun after discharge. (2) The saddle, formed of two cheek pieces, in which the trunnions rest, a bed connecting the trunnion blocks, and a pivot,

entering the bed, and lastly, the sighting gear. (3) The bed and truncated pedestal fixed to the deck. The bed has on its upper extremity a collar, holding the saddle pivot. On this pedestal revolves the whole system. The brake is of the Canet construction, imposing the minimum strain on the various parts of the mounting. The recovery of the gun after recoil is completely automatic, and is effected at all angles of elevation, with the assistance of the springs. A special arrangement provides for putting the guns out of the firing position either immediately after delivering a round, or at any other moment, by

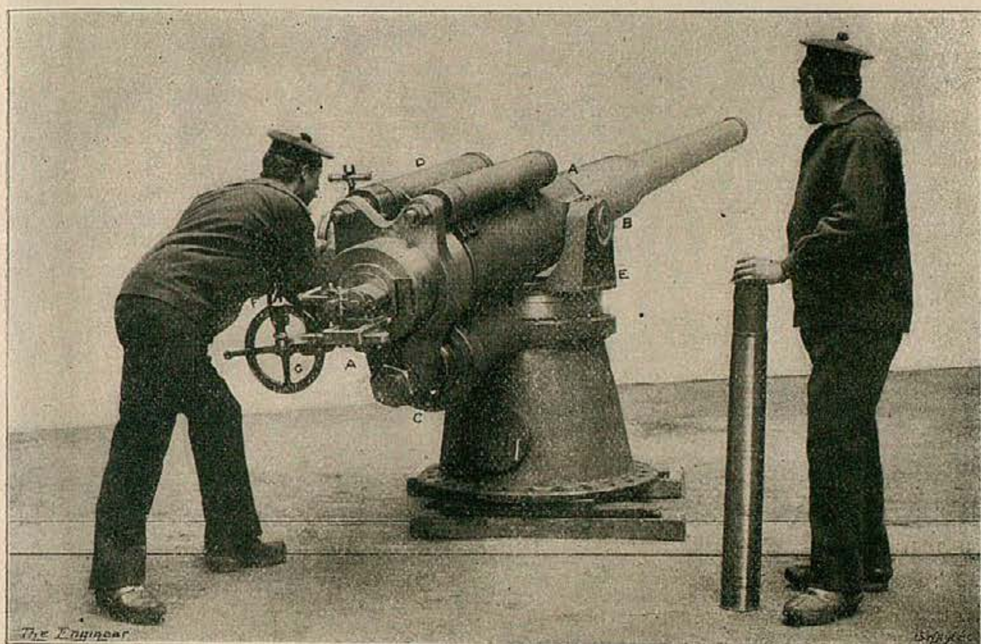


FIG. 4.

10-CENTIMETRE 50-CALIBRES QUICK-FIRE CANET GUN.

means of hydraulic gear. Elevation is performed by the pointer, or "No. 1," by means of the winch or hand wheel F and an endless screw gearing on a toothed sector (seen at J in the engraving of the 65-mm. gun). Direction is also given by the pointer by means of a hand wheel and screw shaft, gearing on a horizontal toothed ring on the bed where the pointer is shown elevating with his left hand and traversing with his right. For firing at night electric lamps throw beams on the points of the fore and breech sights, the intensity being regulated as may be desired by a double rheostat commutator. A small hand pump serves at the same time for refilling the brake cylinder, and for putting the piece out of the firing position. The

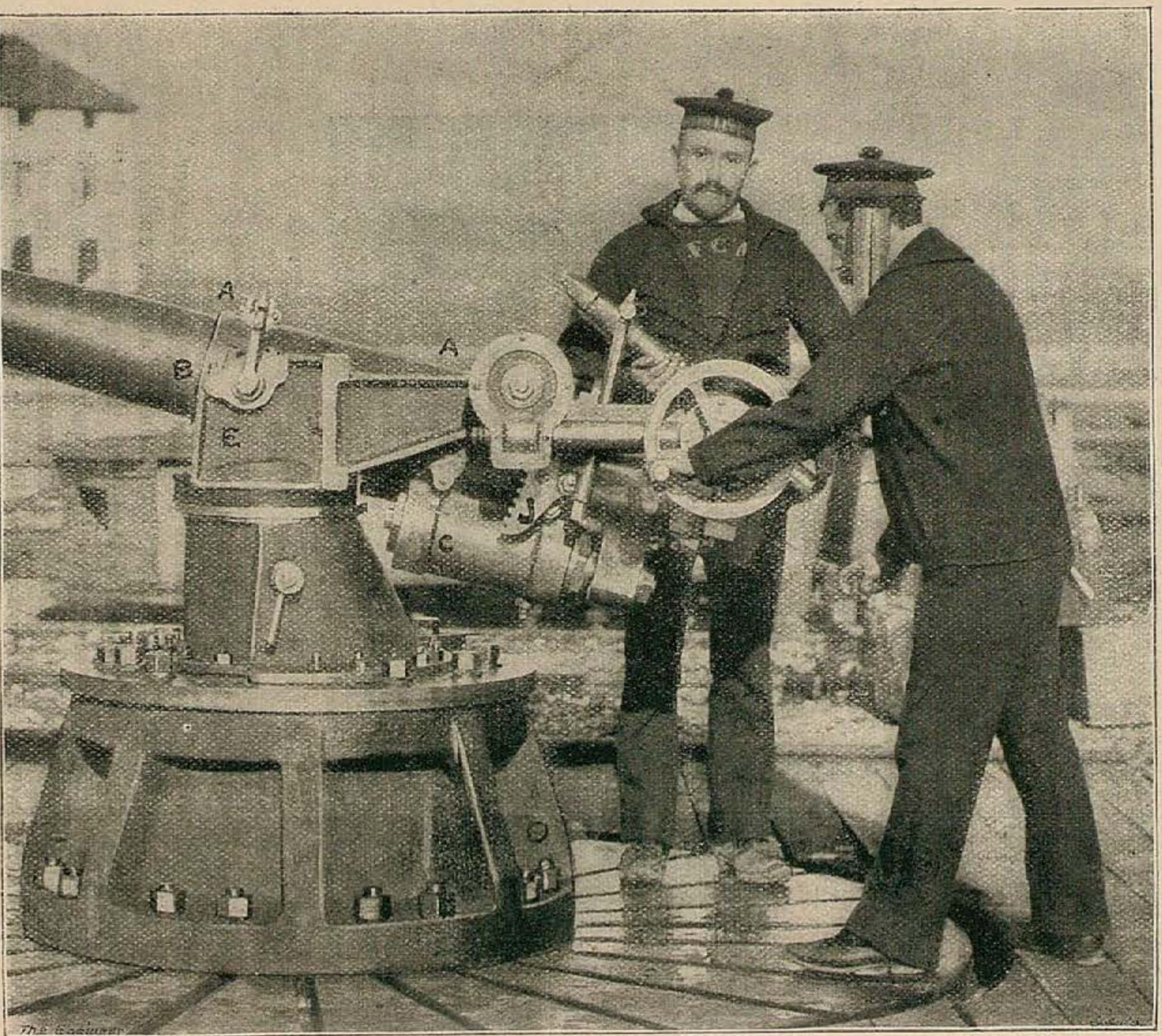


FIG. 5.—65-MILLIMETRE 50-CALIBRES QUICK-FIRE CANET GUN.

arrangements for sighting, including fore and breech sights, are fixed on the cradle cylinder, and do not move when the gun recoils, allowing thus of the pointer keeping his eye constantly in the line of sight, which is indispensable for rapid fire.

The 65-mm. gun-mountings (Fig. 5) resemble the above, except that the recuperator or recovery cylinder is placed on the side of the cradle, and the traversing gear is dispensed with, because traversing is effected by the shoulder of the pointer, or "No. 1," pressing against a long shoulder piece.

To sum up, the *matériel* is very simple, thoroughly carried out. The movements are easy, and well adapted for quick fire. Further, a glance at the carriages shows that they are less cumbrous and more compact than carriages of the same system of earlier type, which have been described in various publications.

The view of the 10-cm. gun (Fig. 4) is a good illustration of the pointer keeping his eye on the line of sight while the piece is being loaded. This figure will make apparent the importance of this question, on which such stress was laid in the discussion in the French Chamber. Curiously enough, England and France only seem to have realised the importance of this at a comparatively late date. At Chicago, in 1893, when the quick-firing system was already well developed, very few quick-firing guns exhibited had provision made for this.

Elswick claim to design.

On this description appearing in the *Engineer*, it was claimed on behalf of Elswick that the 10-cm. mounting is their design as given in *Engineering*, 2nd March, 1894, and fitted on board the Benjamin Constant, a ship built by the Forges et Chantiers de la Méditerranée. The 20-pdr. pedestal mounting shown in the *Annual* for 1894, facing p. 394, is also referred to as exhibiting the same design. The arrangement of the spring boxes has, however, since been altered as they are now placed under the gun for protection.

Weling's breech mechanism.

A breech mechanism, shown in Fig. 6, the invention of Weling, a Swedish engineer, has met with strong approval. For the interrupted thread seen in the French system is substituted, in the portions or segments, an increase in the radius or calibre at that place exceeding the height of the screw thread. The segments thus form successive steps, which admit of the screw thread being continued through them without interruptions, each portion being able to advance home directly over the even portion which is next to it. A break must naturally be provided at the completion of the circle, but the screw is able to rest in bands over ten-twelfths of the circumference, amounting to about fifty per cent. more than possible in the ordinary interrupted screw. Out of eight segments, where on the interrupted system

four would be blank, on Weling's system two only are wasted, that is, there is a bearing over six segments instead of only four. A still greater gain may be secured in the 10-in. gun where there are twelve segments. There ten are available instead of six, the actual gain being nearly six per cent., as there is a little waste in clearing

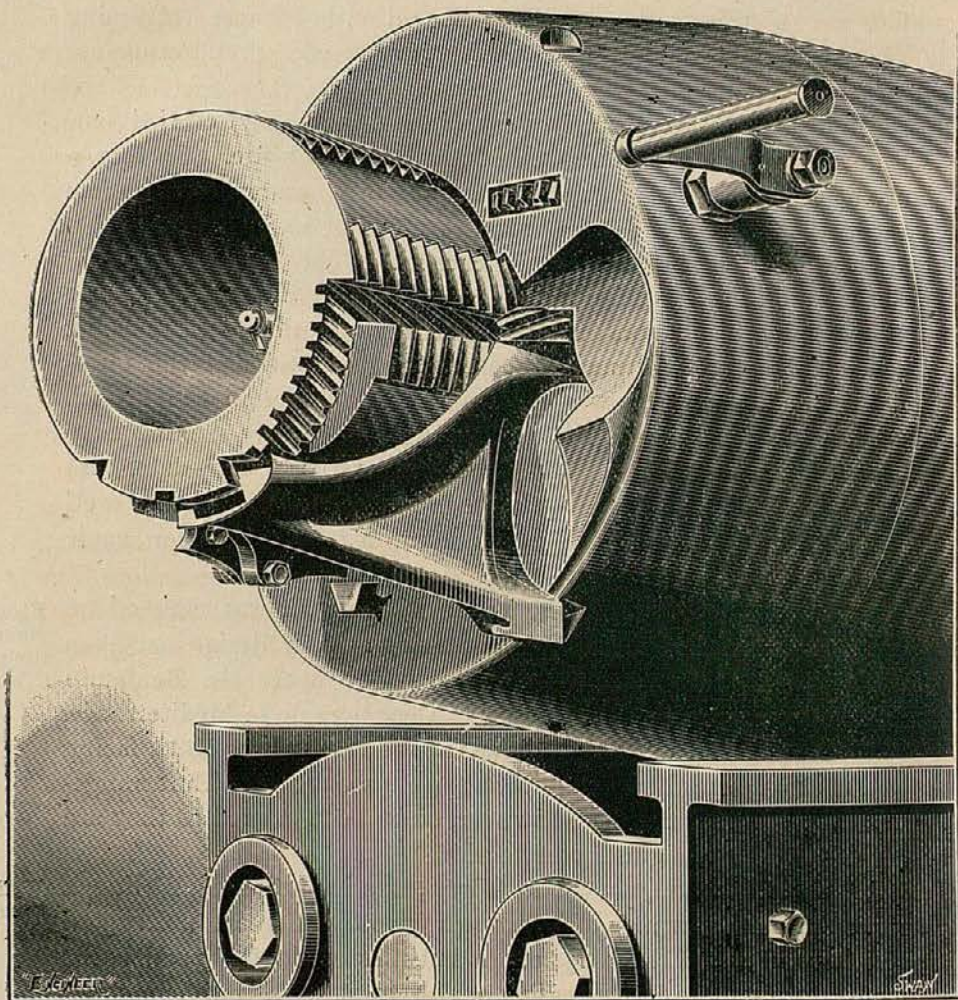


Fig. 6.

grooves. This advantage may be utilised in saving weight, and it is claimed that in the breech mechanism for the 16-in. gun this would amount to half a ton.

Colt automatic gun.

The Colt Patent Firearms Company have brought out an automatic gun under Browning's patent. It is worked by the action of the gas of explosion, and the cartridges are fed by means of a band. Maxim

claims that a close examination leads him to the conclusion that this piece contains no element that is not his and already patented in all countries granting patents. The chief recommendation of the piece appears to be that it works with the 0·236-in. bore small armed cartridge, which meets an important need in the United States Navy.

Accident to a Canet gun.

An accident happened to a Canet quick-firing gun at Havre, on October 26th last, of the 65-mm. calibre. It was due to the charge being fired before the breech was closed. Neither was the gun burst nor the breech piece blown out. The cartridge case offered some resistance in loading, and in striking it to overcome this, the fulminate was exploded and the charge fired. The breech not being closed, the gas rushed out, projecting the base of the metal cartridge case, and carrying away any fittings in its path, by which the men standing in rear were struck. What is to be concluded from this melancholy accident? It is obvious that the merits of a breech mechanism are not tested by an explosion which takes place when the breech is open. The cartridge is the next element to consider. If it was a new one, it certainly ought not to have called for such force as appeared to have been necessary to push it home. Quick-firing cases, however, after repeated use, must suffer and occasionally call for rough treatment. The main point to be noticed is the evil of detonating composition being present in a quick-firing cartridge, though this is not the first illustration of the danger thus incurred. It is due to Elswick to observe that the electric firing which has been for many years advocated by that firm dispenses with the presence of detonating compounds, and avoids the liability to this class of accident.

Experiments with cordite.

Some experiments were carried out at the Woolwich Arsenal on Feb. 2nd with the storage of cordite. There are three natures of packages in use: first, plain strong wooden boxes holding 100 lbs. each, with lids held down by small brass screws; second, plain wooden boxes with thin metallic linings, holding about the same amount; and lastly, strong metal cylindrical cases used for holding the cartridges of the larger nature of guns. These three natures of cases were filled with the smallest cordite made, namely, that used chiefly for small arm ammunition. In the first instance, when one of each of the cases was ignited, the cordite burned away fiercely without any explosion, merely forcing open the cases to allow the gases to escape. Twelve cases of each kind were then stacked together, and the bottom centre case of each stack was fired. The wooden boxes which were ignited blazed up fiercely and set one neighbouring box on fire, but there was no explosion, and ten boxes in each heap remained intact. The stack of strong metal cases

behaved very differently; the case ignited, being strongly held down, acted as a detonator to the rest, and the result was a severe explosion, which formed a considerable crater in the soft ground of the marshes, and scattered mud and *débris* in all directions. The violence of the explosion appears to have been greater than was expected. These experiments confirmed the conclusions derived from earlier observations, namely, that the best packages are strong wooden boxes of which the lids can easily be forced off by slight internal pressure. The experiments are to be carried on further, and will embrace the question of the best construction of magazines.

Action of cordite on copper.

A peculiar action of cordite on the copper bands of projectiles has been reported. After the battle of Yalu, the bores of the guns of the Yoshino were found to be covered with copper, which had the appearance of enamelling, and it was only removed by scraping with steel scrapers fixed for this purpose in a wooden head. A red shade noticeable in the colour of the smoke of guns firing cordite is attributed to the same action.

New Russian smokeless powder.

In Russia, a series of experiments were commenced under the direction of Professor Mendeleyeff in 1890, with a view to arrive at the best smokeless powder. The result has been the adoption of a gun-cotton termed "pyro-collodion," to which no nitro-glycerine is added. It is claimed that the action on combustion is a complete chemical process, and consequently uniform in all cases; it is very regular and slow, and it is absolutely smokeless. With pyro-collodion Russian guns will have a service muzzle velocity of 2600 ft.-secs.

Attack of coast batteries by French ships.

Toward the end of January last the French ships Amiral Duperré and Sfax carried out some experimental firing against a specially erected fortification on the "Ile de Levant," in accordance with an agreement arrived at between the Navy and War Departments. The Amiral Duperré and the Sfax had each been directed to carry out several series of firing, during which the course, the speed, the end to be attempted, and the nature of the firing were changed, each series occupying about three-quarters of an hour. During the experiments, which lasted altogether six hours, more than 1000 shots were fired from 34, 16, 14, and 10 cm. (13·3, 6·2, 5·5, and 3·9-in.) guns, which number works out at a little over two shots a minute per ship. A certain number of shell were filled with mélinite. As it was necessary to examine the effects of the fire after each series, the experiments had to be spread over a period of three days. The fortifications consisted of two batteries constructed by the engineers after the most approved fashion, and in these were represented very accurately, by models and dummies, the guns with their gun detachments and accessories. In each battery was simulated an armament of eight guns, four of

heavy and four of medium calibre. One of the batteries on the slope of the island had an altitude of 65 ft., the second, crowning the crest of the island, had a command of 328 ft. More than half the dummies of the gun detachments were hit, and about one quarter of the guns were dismounted or more or less damaged. The harm done to the forts themselves was insignificant, both from the shells filled with mélinite and those filled with black powder. The mélinite shells, which burst into very small pieces, would have been particularly deadly to the *personnel.* Some fragments were found at more than 1000 yards from the batteries, proving the enormous initial velocity produced by the explosion.

Attention might be called to the advantages that forts possess in being able to draw on a practically unlimited supply of men and ammunition, and also that the defence would continue as long as the work is tenable and a gun remains fit to fire. To dismount a few guns and put out of action a fair number of their gunners—who could have been replaced from others held in reserve—it is estimated that the Sfax and the Amiral Duperré found it necessary to fire 39 tons weight of projectiles. During the last continental war it was calculated that for every man killed, his weight in metal had to be fired; but in the experiments under consideration not less than nine or ten times his weight in metal was required to remove one man of the defence. Such are the disadvantageous conditions under which ships are placed when contending against well-constructed fortifications. If, on the other hand, we suppose that the sixteen guns which served as a target had replied to the fire of the Amiral Duperré and the Sfax, the two vessels would have been several times hit, and have received some serious damage. A single 9·5-in. shell fired from the commanding position of the battery on the crest would have been most dangerous to the ships' decks, and in any case would have produced destructive results.

Attack of ships by mélinite shells.

Experiments of just the opposite nature, viz., the attack of land batteries on ships, were made toward the middle of June at Fort Chevagnac, in Cherbourg, a 16-cm. (7·48-in.) gun being used with mélinite shell. The old La Galissonière, to which steel plates had been fixed specially for the occasion, was used for a target. Four shells were fired from the fort and pierced the hull of the vessel, the water-tight bulkheads being completely traversed by the projectiles. In the interior the gun deck was strewn with *débris* of all kinds. Of the two sheep which had been placed on board the warship, one was killed, its back having been carried away by the bursting of one of the shells; the other was safe and sound. It was thought that they both would have been killed by the shock caused to the vessel

by these experiments. From this it is concluded that a man would also be able to resist the shock. On the other hand, fragments of shell caused great damage, and penetrated to almost every part of the vessel. These experiments are finished for a time, but probably will be continued later on another part of the vessel.

The above trials are both important and interesting. Nevertheless, the accounts leave much to be wished for. The "lumping" of the results obtained by the ships against the batteries with 65 ft. and 328 ft. command deprives them of most of their value. The former command is found almost everywhere, the latter in comparatively few ports. The injury effected in the case of the first-named would be very much greater than in the latter, which would be considered almost secure against ships' fire.

Gun accident on board a Russian ship.

A terrible gun accident occurred on board the Russian ironclad Sissoi Veliky in the Mediterranean on 15th March, 1897. So far as can be gathered from reports which are obviously incorrect, a 12-in. gun charge was ignited with the breech entirely open while loading or while it was not properly closed in firing, so that the gas rushed into the turret, blowing the top off and killing or mortally wounding twenty men and one officer, besides severely wounding many others, and destroying some parts of the ship's structure.

NOTES ON TABLES OF ORDNANCE.

QUESTIONS have been raised on the data given in the tables, which make it desirable to state the authorities on which they are based in each case, especially as they vary considerably.

The BRITISH TABLE is taken from official sources, and it is hoped that the figures are as reliable as any in existence.

The UNITED STATES TABLE, originally obtained from official sources has by the kindness of the U.S. Naval Attaché been corrected at the Naval Bureau of Ordnance, and therefore stands on the highest authority.

The SERVICE ORDNANCE TABLES OF OTHER POWERS are taken mainly from the *Austrian Marine Almanack*, occasionally corrected or supplemented by information received directly from manufacturers of guns, or other sources.

The energies and perforations are worked out afresh as indicated. Generally, the old British system of Fairbairn or Maitland has been used for velocities under 2000 ft.-secs., and that of Krupp or Tresidder, which are practically identical, for higher velocities.

The Q.-F. ORDNANCE TABLES are obtained directly from the manufacturers, and the data in them consequently are given on their authority. The ELSWICK TABLE consists wholly of guns supplied for service and Q.-F. guns in the fullest sense. All pieces above 8-in. calibre being excluded, although fitted with special arrangements and automatic gear.

Objection has been raised to estimated figures appearing on tables. This is unavoidable. A new gun frequently stands for a time with a muzzle velocity which is only estimated, and experience shows that it is often subsequently slightly reduced. It is difficult to say absolutely where the velocity is an estimated one, but obviously it is indicated when several new pieces appear with the same velocity. For example, in the French table this year the nine newest guns all have the very high muzzle velocity of 2625 ft.-secs. In continental units this is 800 metres, and is obviously an estimate, but to omit these figures, which will probably be nearly realised, would ruin the table.

The chief new features are: in the British table, the long 9·2-in. gun of 46·7 calibre, and in the French table the pieces of the model '93, and the Q.-F. guns at the end of the table.

BRITISH RIFLED ORDNANCE.

(Chiefly founded on the official "List of Service Ordnance, 1891." Corrected by Official List, 1895, card issued 1896, and subsequent information.)

	Ordnance. Nature. Calibre or Pr.	Weight.	Mark and Service.*	Total length in inches.	Length of Bore, including Chamber.	Chamber. Diameter.	Chamber. Length to base of projectile.	Rifling. Twist one turn in: Least at breech.	Rifling. Twist one turn in: Greatest at muzzle.	System.†	Charge (full). Weight.‡	Charge (cordite). Weight.	Charge (cordite). Size.	Projectile. Diameter.	Projectile. Weight.§	Projectile. Bursting Charge of Common Shell.	Value of $\frac{d^2}{w}$.	Value of $\frac{w}{d^3}$.	Muzzle velocity.	Ballistics (with full charges). Total muzzle energy.	Muzzle energy per ton of gun.	Perforation of wrought iron. At muzzle.	At 1000 yards range.	At 2000 yards range.
					calbs.	ins.	ins.	cals.	cals.		lbs.	lbs. oz.		ins.	lbs.	lbs.			f. s.	ft. tons.	ft tons	ins.	ins.	ins.
B.L. GUNS.	16·25-in.	110¼ tons.	I.	524·0	30·0	21·125	84·5	130	30	P. EOC.	960 S.B.C.	..	..	16·25	1800	‡‡187½ / **179¼	0·147	0·420	2087	54,390	492	37·5p	32 0	30·1
	13·5-in.	69 & 67 tons.	I. II. III. & IV.	433·0	30·0	18·0	66·5	120 or 60	30	P. Rifling increasing twist, in E.O.C. System from 0. Hook Sect. II. from 1 in 60; all others belong to Hook Sect. I. except 12-in. wire, which is special.	630 S.B.C.	..	..	13·5	1250	**$85\frac{9}{16}$	0·146	0·508	2016	35,230	511 / 526	34·2p	28·2	26·4
	12-in.	45 & 46 tons.	III. IV. V. & V.w	328·5	25·25	16·0	48·0	120	35		295 P.Br.	88 8	30	12·0	714	$31\frac{9}{16}$ / ‡‡95 / **79	0·202	0·413	1914	18,130	403 / 394	22·6	20·6	18·8
	12-in.	46 tons.	VIII. Wire	445·5	35·43	16·0	70·0	0	30		..	167 8	50	12·0	850		0·169	0·492	2367	33,020	718	36·3p	33·0p	29.9p
	10-in.	29 tons.	II. III. III.a & IV.	342·4	32·0	14·0	54·0	60	30		252 P.Br.	..	..	10·0	500	37¾	0·200	0·500	2040	14,430	498	25·4p	20 4	18·6
	9·2-in.	21 & 22 tons.	I. & II.	255·8	25·56	11·0	44·0	118·5	35		140 P.Br.	..	..	9·2	380	18½ / ‡‡33 / **$31\frac{14}{16}$	0·223	0·488	1781	8,356	411 / 392	17·7	15·9	14 4
	9·2-in.	24 & 22 tons.	III. V. VI. VI.a&c & VII.	310·0	31·5	12·0	43·0	120	30		164 P.Br.	..	..	9·2	380		0·223	0·488	2065	10,910	455 / 496	22·9p	18·7	16·9
	9·2-in.	25 tons.	Wire	..	40 08	..	..	..	..		..	63 0	40	9·2	380	..	0·223	0·488	2347	14,520	:81	27·6	23·6	19·4
	9·2-in.	27 tons.	Wire	..	46 74	..	..	..	..		..	..	..	9·2	380	..	0·223	0·488	2700d	19,220	712	34 3	..	..
	8-in.	14 tons.	III.	226·3 / 222·5	25·1	10·5	34·5	120	35		104 P.Br.	28 12	20	8·0	210	13½ / ‡‡29 / ‡‡18½	0·305	0·410	1953	5,554	427 / 397	15·4	13·4	11·7
	8-in.	15 tons.	IV.	254·5	29·6	10·5	38	110 / 60	35 / 30		118 P.Br.	32 10	20	8·0	210		0·305	0·410	2150	6,730	449	19·0p	14·9	12·9
	8-in.	14 tons.	VI.																2200	7,047	490	19·6p	15·4	13·5
	6-in.	82 cwt.	(80 pr.)	162·6	26·0	7·5	27·4	0	40		34 S.P.	..	..	6·0	80	$6\frac{2}{16}$ / ††7¾	0·450	0·370	1880	1,961	484	10·5	8·4	6·8
	6-in.	89 cwt. / 5 tons.	III. a / III. b	170·7	25·53	8·0	26·75	120	35		36 E.X.E. / 48 E.X.E.	14 12	20	6·0	100	$7\frac{6}{16}$ / **$9\frac{13}{16}$	0·360	0·463	1960	2,665	533	12.4	10·5	8·9
	6-in.	5 tons.	IV. / VI.	173·5	26·0	8·0	26·75	120 / 60	35 / 30		48 E.X.E.			6 0										
	5-in.	38 cwt. / 40 cwt.	II. / III. IV. & V.	139·15	25·07 / 25·0	5·75	19·05	117 / 120	25	All Hook Section I. or II. P.	15·5 S.P.	4 7¼	7·5	5·0	50	$4\frac{1}{16}$ / ‡‡$6\frac{15}{16}$	0·500	0·400	1750	1,062	559 / 531	8·5	6·7	5·4
	4-in.	23 cwt. / 26 cwt.	II.II.a III.III.a / IV.V.& VI.	120·0	27 0	5·3	18·5	120	30		12 S.P.	3 1	5	4·0	25	$2\frac{14·5}{16}$	0·640	0·391	1900	625	544 / 481	7·2	5·4	4·0
	20-pr.(3·4)	12 cwt.	I. (L.)	107·5	29·0	3·9	15·5	120	25		6 S.P.	..	..	3·4	18·6	$2\frac{1}{16}$	0·593	0·496	1677	380	633	..	..	..
	12-pr.(3·0)	7 cwt.	I. (L.)	92 35	28·0	3·63	11·0	120	28		4 S.P.	1 0¼	5	3·0	12·5	‡‡$1\frac{8·5}{16}$ / $\frac{10}{16}$	0·720	0·463	·1710	256	740	..	..	..
M.L. GUNS.	17·72-in.	100 tons.	I. L.	391·85	20·48	19·7	59·72	150	50	P.Pl.	450 Pr.[1] Bl. or Pr.[2]	..	..	17·72	2000 0	106	0·157	0·359	1548	33,220	332	25·1	23·3	21·6
	16-in.	80 tons.	I.	321·0	18·0	18·0	59·6	0	50	P.Pl.	450 Pr.[1] Br	..	..	16·0	1700 0	$75\frac{6}{16}$ / c$112\frac{8}{16}$	0·151	0·415	1540	27,960	350	24·3	22·5	20·9
	12·5-in.	38 tons.	I.	230·0	15·84	Unchambered		0	35	W.	130 Pr.[2] or 165 Pr.[1] Bl	..	..	12·5	818·0	$37\frac{8}{16}$	0·191	0·419	1442	11,820	311	17·4	16·0	14·7
	12·5-in.	38 tons.	II.	222·8	15·84	14·0	41·125	438	35	W.	200 E.X.E / 210 Pr.[2] or 190 Pr.[1] Bl								1575	14,070	371	19·3	17·5	15·9
	12-in.	35 tons.	I.	195·0	13·54	Unchambered		0	35	W.	110 Pb.[2]	..	..	12·0	714·0	$34\frac{10}{16}$	0·202	0·413	1340	9,566	273	15·9	14·5	13·2
	12-in.	25 tons.	II.	182·5	12·09	„		100	50	W.	85 Pb.[2]	..	..	12·0	614·0	$28\frac{2}{16}$ / c$61\frac{10}{12}$	0·235	0·355	1292	7,190	288	13·4	12·1	11·0
	11-in.	25 tons.	II.	180·0	13·18	„		0	35	W.	85 Pb.	..	..	11·0	548·0	27	0·221	0·411	1360	7,028	281	14·2	12·9	11·7
	10-in.	18 tons.	II.	180·0	14·55	„		100	40	W.	70 Pb.	..	..	10·0	410·0	23½	0·244	0·410	1379	5,408	300	13·1	11·7	10·5
	9-in.	12 tons.	V.	156·0	13·89	„		0	45	W.	50 Pb.	13 4	7½	9·0	256·0	17	0·316	0·351	1440	3,681	307	11·4	9·8	8·5
	8-in.	9 tons.	III.	144·0	14·75	„		0	40	W.	35 Pb.	..	..	7·92	179·0	→$17\frac{12}{16}$	0·358	0·350	1391	2,398	266	9·7	8·2	7·1
	7-in.	90 cwt.	I.	131·0	15·86	„		35	35	W.	22 Pb.	..	..	6·92	114·6	→$11\frac{1}{16}$	0·428	0·334	1325	1,395	310	7·9	6·5	5·7
	7-in.	6½&7 tons.	III. & IV.	133·0	15·86	„		35	35	W.	30 Pb.	..	..	6·92					1525	1,848	284	9·2	7·2	5·9
	64-pr.	64 cwt.	III.	118·0	15·47	„		40	40	Pl.	10 R.L.G.[4]	..	..	6·28	64·5	→ $8\frac{8}{16}$	0·588	0·271	1390	865	270	..	..	..
	64-pr.	71 cwt.	I.	122·72	16·42	Unchambered		40	40	Pl.	8¼ R.L.G.[4]	..	..	6·29	64·5	→$8\frac{8}{16}$	0·588	0·271	1260	715	201	..	..	..
	40-pr.	35 cwt.	II. L.	120·0	22·0	„		35	35	W.	6¾ R.L.G.[4]	..	..	4·75	38·8	→$3\frac{6}{16}$	0·582	0·362	1425	546	312	..	..	..
	25-pr.	18 cwt.	I. L.	98·0	22·0	„		35	35	W.	4½ R.L.G.[4]	..	..	3·94	24·96	→$1\frac{13·5}{16}$	0·622	0·408	1350	315	350	..	..	..
	16-pr.	12 cwt.	I. L.	78·0	19·0	„		30	30	F.M.	$3\frac{3}{16}$ R.L.G.[4]	..	..	3·54	16·1	→$1\frac{2}{16}$	0·771	0·366	1355	205	342	..	..	..
	15-pr.	422 lbs.	I. L.¶	70·5	20·0	3·2 (decrsd.)		60	20	P.	1½ R.L.G.[2]	..	..	3·3	14·25	$2\frac{6}{16}$	..	..	1040	113	600	..	..	..
	13-pr.	8 cwt.	I. L.	92·0	28·0	3·15	14·13	100	30	P.	3¼ R.L.G.[4]	..	..	3·0	13·0	$\frac{11}{16}$	0·689	0·484	1595	232	580	..	..	..
	9-pr.	8 cwt.	I. & II.	72·0	21·17	Unchambered		30	30	F.M.	1¾ R.L.G[2]	..	..	3·0	9·1	→$8\frac{12}{16}$	0·996	0·335	1330	119	298	..	..	..
	9-pr.	6 cwt.	I.	61·0	17·67	„		30	30	F.M.	1½ R.L.G.[2]	..	..	3·0					1250	97	323			
	9-pr.	6 cwt.	II. / III. IV.	74·5 / 74·875	22·0	„		30	30	F.M.	1¾ R.L.G.[2] / 1½ R.L.G.[2]	..	..	2·94	9·1		0·956	0·356	1330	119	397	..	..	..
	2·5-in.	400 lbs.	I. & II. L.¶	70·45	26·6	2·56	11·07	80	30	P.	1½ R.L.G.[2] or $1\frac{10}{16}$ R.L.G.	..	..	2·5	7·25	$\frac{4·5}{16}$	0·819	0·488	1440	101	377	..	..	..
	7-pr.	200 lbs.	IV.	41·0	12·0	Unchambered		20	20	F.	¾ R.F.G.	..	..	2·94	7·29	→$\frac{7·25}{16}$ / $\frac{14·5}{16}$	1·185	0·287	950	46	515	..	..	..
R.B.L. GUNS (screw).	7-in.	82 cwt.	..	120·0	14·21	7·2	16·0	37	37	P.	11 R.L.G.[2]	..	..	7·0	91·25 / 108·3	$8\frac{4}{16}$ / $10\frac{5}{16}$	0·537	0·266	1100	909	222	..	..	..
	40-pr.	35&32 cwt.	..	121·0 & 120	22·39	4·96	13·5	36½	36½	P.	5 R.L.G.[2]	..	..	4·75	40·7	$2\frac{6}{16}$	0·554	0·380	1160	380	217	..	..	..
	20-pr.	15&13 cwt.	..	66·125	14·43	3·94	11·0	38	38	P.	2½ R.L.G.[2]	..	..	3·75	21·8	$1\frac{5}{16}$	0·645	0·414	1000	153	203	..	..	..
	12-pr.	8 cwt.	..	72·0	20·458	3·2	8·5	38	38	P.	1½ R.L.G.[2]			3·0	11·25	$\frac{8}{16}$	0·800	0·417	1239	200	299	..	..	..
	9-pr.	6 cwt.	..	62·0	17·5	3·2	7·0	38	38	P.	1⅛ R.L.G.[2]			3·0	8.56	$\frac{6}{16}$	1·052	0·317	1055	66	220	..	..	..

L., Land service only. * The Roman numeral is the number of the pattern given. Further differences in pattern are indicated by letters a, b, and c.
† P. means Polygroove; Pl., Plain; W., Woolwich; F., French; F.M., French modified; H., Henry; E.O.C., Elswick Ordnance Co.
‡ S.B.C. (in column for charge) means Slow-burning Cocoa; P.Bl. stands for Prismatic Black; P.Br. for Prismatic Brown; Pb., Pebble; R.L.G., Rifle Large Grain; L.G., Large Grain; E.X.E., Experimental letter E.
§ For the higher natures the weight of projectile given is for Palliser shot; for the lower natures it is for filled common shell. ** Cast steel. ‡‡ Forged steel. †† Double shell. ‖ For high-angle fire.
¶ Mountain-service jointed gun. §§ There is a 6-cwt. 12-pr. Wire Gun for land service. → Studded projectiles. a Unchase-hooped. b Chase-hooped. c For steel common shell. p Perforation by Krupp's formula.
d Estimated.

BRITISH RIFLED ORDNANCE—*continued.*

(Chiefly founded on the official "List of Service Ordnance, 1891." Corrected by Official List, 1895, and subsequent information.)

Ordnance.										Charge. (full).	Charge (cordite).		Projectile.						Ballistics (with full charges).				
Nature.					Chamber.		Rifling.														Perforation of wrought iron.		
							Twist one turn in																
Calibre or Pr.	Weight.	Mark and Service.*	Total length in inches.	Length of Bore, including Chamber.	Diameter.	Length to base of projectile.	Least at breech.	Greatest at muzzle.	System.†	Weight.‡	Weight.	Size.	Diameter.	Weight.§	Bursting Charge of Common Shell.	Value of $\frac{d^2}{w}$.	Value of $\frac{w}{d^3}$.	Muzzle velocity.	Total muzzle energy.	Muzzle energy per ton of gun.	At muzzle.	At 1000 yards range.	At 2000 yards range.
				calbs.	ins.	ins.	cals.	cals.		lbs.	lbs. ozs.		ins.	lbs.	lbs.			f. s.	ft. tons.	ft. tons.	ins.	ins.	ins.
QUICK-FIRING GUNS										lbs. oz.													
6·0 in.	7 tons	I. & III. II. (Wire)	219·25	40	..	..	60	30	P.	29¾ E.X.E.	13 4	30	..	100·0	..	0·360	0·463	1882 2200	2457 3356	351 479	12·0 16·1*a*	10·1 10·9	8·5 9·3
4·7 in.	41 cwt. 42 ,,	I. II. III. & IV. Wire	194·1	40	..	..	100	31·4	E.O.C.	12 0 S.P.	5 7	20	4·72	45·0	..	0·495	0·428	1786 2188	995 4 1494	485·7 711	8·6 11·9*a*	6·0 7 8	4·6 6·2
4 in.	26 cwt.	I. Wire	165·25	40	..	...	..	30	P.Pl.	..	3 9	15	..	25·0	..	0·640	0·390	2300	1046	654	11·2*a*	7·6	5·0
12-pr.	12 cwt.	I.	123·6	40	..	..	120	28	E.O.C.	..	1 15	10	3·0	12·5	..	0·667	0·500	2210	423	677	8·1 *a*	5·2	3 4
12-pr. §§	8 cwt.	I.	87·6	28	..	..	60	28	E.O.C.	..	13¾	10	3·0	12 5	..	0·667	0 500	1585	223·8	544	5·6	4·0	..
Hotchkiss . 6-pr...	8 cwt	I. & II.	97·63	40·0	..	..	180	29·9	P.Pl.	1 15 Q.F.	*b* 7¾	5	2·24	6·0	..	0·836	0·534	1818	137·5	344·8	3·9	2·8	..
Nordenfelt . 6-pr...	6 cwt.	I. II. & III.	104·4	42·3	..	..				1 15 Q.F.													..
Hotchkiss . 3-pr ..	5 cwt.	I. & II.	80·63	40	..	..	25	25	P.Pl.	1 8 Q.F.	*b* 6⅛	5	1·85	3·2	..	1·037	0·521	1873	80·3	321·2	3·1	1·8	..
Nordenfelt . 3-pr...	4 cwt.	I. L.	91·5	45·4									..	..	..	..	..	1920	..	..	..	1·9	..
MACHINE GUNS.										grains.				oz. grs.									
Nordenfelt, 2 bar. 1-in.	180 lbs.	I.	52·75		..	..	35	35	H.	625 M.G.	..	..	1·0	7¼ 0	..	2 207	0 453	..	..	..	¼-in. at 200 yards.		
,, 4 bar 1-in.	447 lbs.	III.**	57·0		..	..	35	35	H.														
,, 5 bar 0·45-in.	160 lbs.	I. G. G.	46·0		..	..	22	22	H.	85 R.F.G₂.	..	..	0·450	480	..	2·952	0·751	..	..	..	Same as MH.Rifle, which perforates ⅜ in. wrought iron plate at 600 yds., 7/16 in. at 400 yds., ½ in. at 100 yds.		
	143 lbs.	II. G. G.	42·25		..	..	22	22	H.														
Gardner, 1 bar 0·45-in.	76 lbs.	I. G. G.	47·0		..	..	22	22	H.														
,, 2 bar 0·45-in.	120 lbs.	I. G. G.	47·0		..	..	22	22	H.														
,, 5 bar 0·45 in.	268 lbs.	I. G. G.	53·5		..	..	22	22	H.														
Gatling, 10 bar 0·65 in.	787 lbs.	..	66·5		..	..	30	30	H.	270 R.F.G₂.	..	..	0·65	1422	..	2·109	0·730	..	..	..	Not known.		
,, 10 bar 0·45-in.	402 lbs.	I. G. G.	59·0		..	..	22	22	H.	85 R.F.G₂	..	..	0·450	480	..	2·952	0·751	..	..	..	Same as MH.Rifle		
,, (Acclesfeed)	266 lbs.	I. G. G.	51·0		..	..	22	22	H.														
Maxim, 1 bar 0·45 in.	63 lbs.	I G. G.	43·75		..	..	22	22	H.														

* L., Land-service only, but might concern navy when serving on land. The Roman numeral is the number of the pattern given. † P. means Polygroove; Pl., Plain; W., Woolwich; F., French; F.M., French modified; H., Henry. E.X.E., Experimental letter E. § For the higher natures the weight of projectile given is for Palliser shot; for the lower natures it is for filled common shell.
** I. and II. differ chiefly in being 7 lbs. lighter; I. has a pitch of rifling of 1 in 60 in.; G.G., Gardner Gatling; H., Henry. *a* By Krupp's formula. *b* With 4 drs. R.F.G.

AUSTRIAN NAVAL ORDNANCE.

	Krupp Steel B.L. Guns.											Uchatius. St., Br.					Cast Iron BL.
Designation by Calibre, in centimètres	30·5 L. 35 C. 80	26 L. 22	24 L. 35 C. 86	24 L. 22	21 L. 20	15 L. 35 C. 86	15 L. 35 C. 80	15 L. 26	15 L. 26	12 L. 35 C. 80	12 L. 35 C. 87	15 L. 25	15 L. 37	12 L. 35	9 L. 24	7 L. 15	15 L. 21
Calibre, in inches	12·01	10·24	9·45	9·27	8·24	5·87	5·87	5·87	5·87	4·72	4·72	5·87	4·72	4·72	3·43	2·60	5·87
Length — Total, in Feet	35·11	18·77	27·60	17·16	13·73	17·13	17·13	12·63	12·63	13·8	13·8	12·19	14·38	13·97	6·76	3·28	10·13
Length — Rifled Portion, in inches	314·8	148·4	233·2	135·9	105·0	151·4	149·6	105·7	111·6	128·5	126·3	111·4	123·2	123·8	57·5	23·8	89·8
Length — Powder Chamber "	69·9	46·1	69·3	41·7	37·0	37·8	35·4	29·3	23·4	24·0	26·3	23·6	36·6	31·65	16·5	11·0	18·0
Length — Of bore in calibres	35	19·0	35	22·0	20·0	35	35·0	25·8	25·8	35·0	35	24·9	37	35·0	23·7	15·0	18·4
No. of Grooves	68	32	25	32	30	36	36	24	36	32	32	36	32	32	24	18	30
Twist in calibres	..	70	26·9	70	59	45—25	25	68·4	45	25	25	45	45—25	25	45	30	63·2
Weight — Gun, tons	47·8	21·7	26·5	14·5	8·68	5·7	4·69	3·94	3·94	2·25	2·46	3·35	3·2	2·85	0·479	0·09	2·81
Weight — Breech Block, in lbs.	..	1951	..	1422	1080	445·3	..	321·9	321·9	..	..	209·4	..	211·6	55·1	18·7	176·4
Weight — Steel Shell "	1003·1	395·7	474·0	292·1	206·6	112·5	86·0	72·8	84·9	57·3	57·3	84·9	57·3	57·3	..	..	..
Weight — Chilled Shell "	..	..	..	..	196·2	..	..	..	..	..	..	..	..	..	..	..	..
Weight — Common Shell "	1003·1	354·2	474·0	263·5	172·0	112·5	69·9	67·2 / 65·5	69·4	57·3	57·3	69·45	57·3	57·3	14·02 / 14·22	6·42	6·11
Weight — Shrapnel Shell "	..	..	..	..	..	112·4	71·9	67·2 / 65·5	69·4	57·3	57·3	69·45	57·3	57·3	15·76	6·88	6·79
Weight — Case Shot "	..	..	..	..	..	..	..	..	..	..	..	..	..	..	16·53	6·94	38·4
Weight of Bursting Charge — Steel Shell "	10·6	8·8	5·1	6·6	4·4	1·3	1·76	1·65	2·09	0·55	0·55	2·09	0·53	0·55	..	..	..
Weight of Bursting Charge — Chilled Shell "	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Weight of Bursting Charge — Common Shell "	35·7	20·3	17·9	15·0	15·0	5·29	3·86	3·86	5·07	2 2	2·2	5·07	2·20	2·21	0·46	0·18	1·87
Weight of Bursting Charge — Shrapnel Shell † in lbs.	..	..	..	..	..	1·26	1·10	1·08	1·08	0·57	0·57	1·08	0·57	0·57	0·20	0·09	0·90
Weight of Firing Charge — Steel and Chilled Projectile, in lbs.	308·6B	89·3 B	105·8A	76·1 B	50·7 C	39·0p	38·8*	21·6 C	20·9 C	19·8 B	17·0A	20·9 C	30·0 B	19·8 B	..	..	..
Weight of Firing Charge — Common Shell, in lbs.	308·6B	59·5	105·8A	44·1	30·9	39·0p	38·8*	14·3 / 21·6 C	20·9 C	19·8 B	17·0A	20·9 C	30·0 B	19·8 B	3·31 / 0·97	0·77 O / 0·35	4·74O
Weight of Firing Charge — Exercising, in lbs.	154·3B	59·5	52·9A	44·1	30·9	28·7	19·6	21·6 C	20·9 C	11·0	..	20·9 C	19·8 B	12·13 B	3·31	0·77 O / 0·35	4·74O
Weight of Firing Charge — Saluting "	19·8	19·8 O	15·4O	15·4 O	8·82 O	4·74	4·74 O	4·74 O	4·74 O	2·4	2·4	4·74 O	2·4	2·4	0·88 O	0·35	4·74O
Muzzle Velocity, in feet	1755·3	1575	2100	1587	1519	1962	1969	1641	1562	1755	1969	1562	1755	1755	1470	978	1017
Muzzle Energy — Total, foot-tons	21,420	6808	14,500	5104	3306	3000	2312	1358	1435	1215	1541	1435	1224	1224	..	..	..
Muzzle Energy — Per inch circumference, foot-tons	567·8	211·6	488·3	175·3	127·7	162·8	125·4	73·7	77·9	82·5	104·0	77·9	82·45	82·45	..	..	..
Thickness of Iron, perforated inches at Muzzle	24·8	15·0	27·4	13·7	11·6	13·4	11·7	8·8	9·1	9·4	10·5	9·1	9·45	9·45	..	..	..

NOTE.—C for cube powder; * prismatic powder; O ordinary powder (inferior); B brown prismatic. † Generally steel.
A Ammon cake powder. p Prismatic Ammon powder.

DANISH NAVAL ORDNANCE.

	Krupp B.L. Guns designated.											Armstrong M.L.					Fins-pong.
Designation by Calibre	35·5 cm.	30·5 cm.	26 cm. long.	26 cm. short.	21 cm.	15 cm. long.	15 cm. medium.	15 cm. short.	12 cm. long.	12 cm. short.	8·6 cm.	10 in.	10 in.	10 in.	9 in.	8 in.†	6 in.
Calibre, in inches	13·98	12·01	10·24	10·24	8·24	5·91	5·91	5·91	4·72	4·72	3·43	10·0	10 in.	10 in.	9·0	8·0	6·04
Total length, in feet	29·1	22·0	32·8	18·77	24·04	17·1	12·63	10·7	11·8	9·6	6·9	17·0	14·5	14·0	13·0	10·8	9·5
Length of Bore, including Powder Chamber, in inches	304·7	227·2	327·6	194·5	264·5	190·3	135·0	112·9	128·8	102·4	73·6	175·5	145·5	140·0	125·0	104·2	100·8
Length of Bore, including Powder Chamber, in calibres	21·8	18·9	32·0	19·0	35	32·2	22·8	19·1	27·3	21·7	21·3	17·5	14·55	14·0	13·3	13·1	16·7
Number of Grooves	80	68	60	60	48	36	36	36	32	32	24	7	7	7	6	6	6
Twist of Rifling, in calibres	45	45	70–25	45	70–25	70–25	45	45	25	40	45	40	40	40	40	50	40
Total weight, including Breech-gear, tons	51·3	35·4	27·6	21·6	13·3	4·7	4·4	3·5	2·13	1·39	0·49	20·0	18·5	18·0	12·5	8·65	2·46
Weight of Breech Block, lbs.	4695·8	2910	2006	1940	903·9	390·2	330·7	324·1	229·2	176·4	101·4	..	..	..	..	..	..
Weight of Steel Shell, "	1157·4	725·3	451·9	451·9	238·1	112·4	..	86·0	..	44·1	..	400	400	400	..	..	..
Weight of Chilled Shell, "	1157·4	725·3	..	451·9	..	..	86·0	86·0	..	44·1	..	400	400	400	250·2	165·3	..
Weight of Common Shell, "	1157·4	725·3	451·9	451·9	238·1	112·4	69·4	69·4	57·3	36·2	15·2	400	400	400	250·2	131·2	55·1
Weight of Shrapnel Shell, "	1157·4	725·3	451·9	451·9	238·1	112·4	86·0	86·0	57·3	44·1	..	..	..	..	..	..	15·4
Weight of Case Shot, "	..	..	..	..	..	..	..	..	..	..	..	191·8	..	..	154·3	127·9	58·4
Weight of Bursting Charge, Common Shell, "	57·3	39·7	25·4	25·4	12·8	6·2	3·0	3·0	1·7	1·4	0·44	26·5	26·5	26·5	18·5	7·5	5·0
Weight of Firing Charge, Steel or Chilled Shell, lbs.	330·7	180·2	191·8	101·4	105·8	41·9	19·3	21·8	17·4	8·8	..	71·7	71·7	71·7	44·1	29·8	..
Weight of Firing Charge, Common Shell, "	330·7	180·2	191·8	112·4	105·8	41·9	19·3	21·8	17·4	8·8	3·3	71·7	71·7	71·7	44·1	19·8	60·6
Muzzle Velocity, Armour-piercing Projectile, feet	1762	1675	2018	1640	2021	1800	1565	1542	..	1416	..	1457	1368	1368	1368	1378	..
Muzzle Velocity, Common Shell, "	1762	1675	2018	1640	2021	1890	1683	1690	1720	1549	1457	1457	1368	1368	1368	1320	1076
Muzzle Energy, Total foot-tons	24910	14110	12770	8428	6745	2784	1461	1418	..	6130	..	5889	5192	5192	3246	2177	..
Muzzle Energy, Per inch circumference, foot tons	568·3	374·1	396·8	262·0	260·6	150·0	78·7	73·0	..	32·8	..	189·0	165·3	165·3	115·8	86·9	..
Perforation at Muzzle, in inches	24·8	20·0	23·4	16·7	16·9	12·8	9·1	8·8	..	5·8	..	14·1	13·1	13·1	10·9	9·5	..

NOTE.—Chilled projectiles will gradually be replaced by steel.
Krupp has supplied 12-cm. and 8·7-cm. Q.F. guns.

† There is another Armstrong gun differing very little from this one.

DUTCH NAVAL ORDNANCE.

	Krupp Breech Loading.							Armstrong Muzzle Loading.			Dutch Breech Loading.		
Designation by Calibre, in centimètres	28	21	17	15 No. 1.	No. 2.	12 No. 1.	12	28	23	18	12 No. 2.	12*l*	7·5
Calibre, in inches	11·02	7·91	6·80	5·87	5·87	4·72	4·72	11·00	9·00	7·00	4·72	4·72	2·95
Total Length, in feet	20·01	24·04	13·94	12·63	17·13	6·89	13·78	14·42	13·00	11·00	6·89	13·78	7·87
Length of Rifled Portion of bore, in inches	170·8	222·2	112·7	111·8	151·4	61·4	128·5	119·0	104·0	95·5	61·4	..	43·2
Length of Powder Chamber "	36·4	42·4	36·0	23·2	37·7	13·0	24·0	26·0	21·9	15·5	13·0	..	6·7
Length of bore, in Calibres	18·8	35	21·9	23·0	35	15·8	35	12·1	14·0	15·9	15·8	35	17·5
Number of Grooves	64	48/64	42	36	44	12	32	9	6	3	12	32	20
Depth of Grooves, inches	0·069	0·059	0·118	0·118	..	0·049	..	0·20	0·18	0·18	0·118	0·06	0·049
Twist of Rifling in Calibres	45	∝ 25	45	40	25	40	25	∝ 45	∝ 45	35	40	∝ 45	∝ 30
Total Weight, in tons	27·21	12·79/13·98	5·51	3·94	4·72	0·79	2·26	24·46	12·50	7·17	0·93	2·31	0·21
Firing Charge — Armour-piercing Projectile, in lbs.	121·3	99·2	27·6	20·9	49·6	..	19·8	86·0	50·7	30·0	..	19·5	..
Firing Charge — Common Shell "	121·3	99·2	27·6	20·9	49·6	2·43	19·8	86·0	50·7	13·9	2·43	19·8	0·82
Weight — Armour-piercing Projectile "	560·0	308·6	132·3	86·0	112·2	41·0	57·3	533·5	249·1	114·6	..	57·3	..
Weight — Common Shell "	476·2	308·6	112·4	69·4	112·2	29·5	57·3	535·7	262·4	116·8	29·5	57·3	9·5
Weight — Case Shot "	273·4	..	63·9	41·9	..	26·5	57·3	185·2	149·9	68·3	26·5	..	9·3
Bursting Charge — Armour-piercing Projectile "	6·6	4·6	2·2	1·1	..	0·44	..	4·4	2·2	2·2	..	..	..
Bursting Charge — Common Shell "	26·5	12·3	6·6	6·6	...	2·0	..	28·7	17·6	8·8	1.8	..	0·44
Muzzle Velocity, feet	1558	1739	1558	1558	2001	971	1755	1332	1476	1558	951	1804	958
Muzzle Energy — Total, in foot-tons	9423	6471	2226	1447	3115	..	1224	6563	3763	1929	..	1264	..
Muzzle Energy — Per inch Circumference, foot-tons	272	260·7	104	84	169·0	..	82·5	191	134	89	..	85·2	..
Perforation at Muzzle, in inches	17·0	16·8	10·5	9·1	13·6	..	9·4	14·0	11·9	9·7	..	9·6	..
Metal employed or system of construction	Steel Jacket and Hoops.		Steel-hooped.		Steel Jacket and Hoops.	Steel-hooped.	Steel Jacket and Hoops.	Steel Tube and Wrought Iron.			Bronze.		

NOTE.—The 23-cm. ML. guns also discharge 113-Kg. (249·1 lbs.) steel shells and 113-Kg. solid shot. The 18-cm. ML. guns discharge steel shells of 51-Kg. (112·4 lbs.) and segment shells of 53-Kg. (116·8 lbs.). The 7·5-cm. BL. guns discharge ring-shells of 4·3 Kg. 9·5 lbs. Of the older guns there are yet extant three sorts—rifled 16-cm. muzzle-loader (mostly bronze), and rifled bronze 7-cm. and 5-cm.

FRENCH NAVAL ORDNANCE.

Date and Pattern of Gun.	Model 1893.					Model 1887.				1870–81.	70–81. 70–84.	1884.					1881.									
Desig. by Calibre, in cms.	34·0	30·5	27·44	24·0	19·4	34	30·5	27	19	27	32	34	27	24	16	14	34 long.	34 short.	27	24	16 heavy.	16 light.	14	10	mm. 90	mm. 65
Calibre, in inches	13·39	12·0	10·8	9·45	7·64	13·39	12·0	10·80	7·64	10·80	12·6	13·39	10·80	9·45	6·49	5·45	13·39	13·39	10·8	9·45	6·49	6·49	5·46	3·94	3·54	2·57
Total length, in feet	..	..	..	..	..	..	..	..	..	23·97	27·93	..	28·47	24·89	17·04	..	33·69	25·32	27·12	23·70	15·14	15·14	14·3	8·6	7·1	3·58
Length of Bore, in inches	..	..	..	..	..	..	..	..	..	269·0	313·8	..	..	..	..	..	380·6	280·2	306·9	269·3	180·9	180·9	162·6	102·6	77·9	41·2
Length of Bore, in calibres	35	40	45	40	40	42	45	45	45	25	25	30	30	30	30	30	28·5	21·0	28·5	28·5	28	28	28	26	22	16
Number of Grooves	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	50	50	42	30	28	20
Depth of Grooves, inches	..	..	..	..	..	..	..	..	..	0·059	0·059	..	..	..	..	..	0·067	0·067	0·059	0·055	0·039	0·039	0·035	0·028	0·024	0·020
Rifling Twist	..	..	..	..	..	..	..	..	..	7°	7°	..	..	..	..	..	7°	7°	7°	7°	7°	7°	7°	7°	7°	8°
Total weight, in tons	52·9	45·9	34·9	22·4	10·6	60·0	49·2	37·1	10·6	24·6	42·3	50·8	27·7	17·9	5·4	3·15	52·2	47·2	27·4	17·7	4·9	3·9	3·2	1·18	0·54	0·09
Weight of Firing Charge — Armour-piercing Projectile lbs.	220·5	198·4	114·6	110·2	44·1	220·5	198·4	114·6	44·1	154·3	282·2 / 249·1	388·0	200·6	..	42·5	..	388·0	337·3	203·9	149·9	42·5	32·6	..	..	..	..
Weight of Firing Charge — Common Shell „	..	..	..	..	..	..	..	..	..	154·3	282·2 / 249·1	..	200·6	..	42·5	27·1	337·3	368·2	203·9	149·9	42·5	32·6	27·1	9·9	3·6	0·79
Weight — Armour-piercing Projectile * lbs.	925·9	643·8	476·2	317·5	165·3	925·9	643·8	476·2	165·3	476·2	760·6	925·9	476·2	317·5	99·2	..	925·9	925·9	476·2	317·5	99·2	99·2	..	..	..	..
Weight — Common Shell „	..	..	..	..	..	..	..	..	..	396·8	630·5	771·6	396·8	264·6	99·2	66·1	771·6	771·6	396·8	264·6	99·2	99·2	66·1	30·9	17·6	5·95
Weight — Case Shot „	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	130·7	130·7	61·7	39·0	19·5	7·7
Muzzle Velocity, in ft.-sec.	2625	2625	2625	2625	2625	2625	2625	2625	2625	1887	1985 / 1804	1969	1969	1969	1969	1969	1969	1804	1969	1969	1969	1821	1936	1673	1493	113[illegible]
Muzzle Energy — Total, in foot-tons	44230	30750	22750	15170	7898	44230	30750	22750	7898	11760	20780 / 17160	24900	12800	8539	2668	1777	24900	20880	12800	8539	2668	2080	..	..	..	..
Muzzle Energy — Per in. circ., foot-tons	1052	815·8	670·7	511·1	329·1	1052	815·8	670·7	329·1	346·6	525·0 / 433·5	591·9	377·5	287·7	130·8	103·9	591·9	496·6	377·5	287·7	130·9	121·3	..	..	..	..
Perforation at Muzzle, inches	42·5†	37·3†	33·7†	29·4†	13·4†	42·5†	37·3†	33·7†	23·7†	19·5	24·0 / 21·7	25·5	20·4	17·8	12·0	10·7	25·5	23·2	20·4	17·8	12·0	11·5	..	..	..	..
„ „ „	..	..	..	..	..	..	..	..	..	..	..	26·6‡	21·1‡	18·4‡	12·4‡	..	26·6‡	..	21·1‡	18·4‡	..	..	..	..	..	..

* Steel or chilled iron. † By Tresidder's formula. ‡ By Krupp's formula.

FRENCH NAVAL ORDNANCE—*continued.*

Date and Pattern of Gun.	75–79.	Jacketed. 1870.		Jacketed. 75	Jacketed. 75	1875				1870.					Q.-F. Guns. 16†	Q.-F. Guns. 16‡	Q.-F. Guns. 14†	Q.-F. Guns. 14	Mod. 92. 10	Mod. 91. 10	Mod. 81. 10‡
Desig. by Calibre, in cms.	37	27	14	27 No. 1	10	42†	34	27 No. 1	10	27	24	19 long	16	14							
Calibre, in inches	14·57	10·79	5·46	10·8	3 94	16·54	13·39	10·8	3·91	10·8	9·45	7·64	6·49	5·46	16·47		13·86		10·00		
Total length, in feet	36·7	17·7	10·3	19·3	9·3	32·5	22	19·3	9·3	17·7	16·2	13·6	12·2	10·3	6 46		5·44		3·94		
Length of Bore, in inches	414·0	194·3	115·0	213·4	104·3	366·0	241·5	213·4	104·3	194·3	179·1	151·0	137·3	115·0							
Length of Bore, in calibres	28·5	18	21	19·7	26	22	18	19·8	26	18·0	19	19·7	19	21	45	30	45	30	60	50	26
Number of Grooves	..	54	28	54	20	84	68	54	20	54	48	28	50	28							
Depth of Grooves, inches	0·079	0·059	0·047	0·059	0·032	0·079	0·059	0·059	0·032	0·059	0·059	0·059	0·039	0·047							
Rifling Twist	7°	4°	4°	4°	7°	7°	4°	4°	7°	4°	4°	4°	7°	4°							
Total weight, in tons	**75·1	22 8	2·6	27·9	1·18	74·8	47·6	27·6	1·18	22·8	15·4	7·9	4·92	2·66	6·29	4·92	4·13	3·84	2·19	1 62	1·18
Weight of Firing Charge: Armour-piercing projectile* . . lbs.	463	136·7	..	165·3	..	604·1	304·2	136·7	..	92·6	62·8	33·1	39·7	..	30·2	19·0	16·1	12.8	8·16	8·16	5 07
Weight of Firing Charge: Common Shell . ”	463	126·8	11·2	145·5	10·1	..	231·5	121·3	7·1	92·6	62·8	33·1	39·7	9·0							
Weight: Armour-piercing projectile . . lbs.	1235	476·2	..	476·2	..	1719·6	925·9	476·2	..	476·2	317·5	165·3	99·2	..	99·21		66·14		30·87		
Weight: Common Shell . ”	1014	396·8	61.7	396·8	30·9	1433·0	771·6	396·8	26·3	396·8	264·6	137·8	99·2	46·3							
Weight: Case Shot . . ”	..	321·9	42·8	321·9	18·7	..	..	321·9	18·7	321·9	211·6	..	68·3	39·7							
Muzzle Velocity, in ft.-sec.	1969	1608	1529	1640	1673	1663	1722	1641	1591	1424	1444	1470	1782	1332	2625	2100	2625	2100	2625	2625	2034
Muzzle Energy: Total, in foot-tons	33210	8515	..	8880	..	17750	19160	8865	..	6695	4592	2477	2183	..	4730	3061	3160	2022	1475	1475	885·5
Muzzle Energy: Per in. circ., foot-tons	725·4	251	..	261·7	..	422	456	261	..	197·3	154·7	103·2	107	..	233·5	150·9	184·9	118 7	119·2	71·6	71 6
Perforation at Muzzle, inches	28·2	16·4	..	16·7	..	21·3	22·2	16·7	..	20·53	20·3	10·4	10·8	..	20·0	14.4	17·7	12·7	14·3	14·3	9·8

* Steel or chilled iron.

** Made at St. Chamond. The Creusôt gun weighs 71·4 tons.

† There are three models of the years 1887, 1891 and 1893, of slightly different weight from the above.

‡ Models 1881 and 1884 converted guns.

GERMAN NAVAL ORDNANCE.

		Krupp Steel Breech-loading Guns, designated by calibre.																				Bronze B.L.
Designation in centimètres		30·5 jack'd.	28	28	26 long.	26 jack'd.	26 short.	24 long.	24 long.	24 long.	24 short.	21 long.	21 long.	17 long.	15 long.	15 short jack'd.	15 short.	15 short jack'd.	12·5 hoop'd.	10·5 long.	8·7	6¶	8
Calibre, in inches		12·01	11·02	11·02	10·33	10·33	10·33	9·45	9·45	9·45	9·37	8·24	8·24	6·80	5·87	5·87	5·87	5·87	4·92	3 96	3·43	2·36	3·19
Length	Total, in feet	21·98	36·75	32 15	18·77	18·77	17·06	31·50	27.56	23·63	15·45	24·0	20·61	13·94	14·67	10·73	10·73	10·68	9·60	12·08	6·89	4·1	5·15
	Rifled portion, in ins.	181·9	§407·9	§352·8	149·8	150·0	129·3	349·6	302·4	201·6	116·2	218·2	176·5	117·1	128·5	93·3	87·1	87·1	85·7	113·6	62·7	44·3	45·9
	Powder Chamber†,,	45·3			44·7	44·4	44·7	..	..	53·5	40·9	75·3	46·7	31·5	31·1	19·0	25·1	25·1	16·7	19 5	10·7	..	9 73
	Bore, in calibres	18·9	40	35	18·8	18·8	16·8	..	..	26·1	16·8	35·6	27·1	21·9	27·2	19·1	19·1	19·1	20·8	33·6	21·4	..	17·4
Number of Grooves		72	..	..	36	48	36	..	..	56	48	48	48	30	36	36	36	36	32	32	24	24	12
Depth of Grooves, in inches		0·079	..	..	0·077	0·079	0·077	..	..	0·059	0·061	0·059	0·059	0·063	0·059	0·061	0·061	0·061	0·059	0·049	0·049	..	0·051
Twist, in calibres		45	..	..	50	50	50	..	..	25*	45	25*	25*	45	25*	45	45	50	40*	25*	40*	..	46
Weight	Gun, including Breech Gear, tons	35·4	43·4	43·2	21·7	18·7	17·7	25·4	21·7	18·7	14·6	13·03	12·3	5·51	4·04	3·44	3·44	3·15	1·38	1·15	0·44	0·10	0·23
	Breech Block, in lbs.	2954	..	..	2050	1973	1973	..	..	..	1378	831·1	908·3	496·0	390·2	324·1	324·1	324·1	163·1	149·9	86·0	..	55·1
	Armour - piercing projectile,‡ in lbs.	725·3	562·2	562·2	412·3	412·3	412·3	474·0	474·0	474·0	306·4	308·6	308·6	117·9	112·4	76·1	76·1	76·1	..	..	..	..	..
	Common Shell, in lbs.	725·3	474·0	474·0	357·1	357·1	357·1	474·0	474·0	474·0	261·5	308·6	308·6	112·9	112·4	65·0	65·0	65·0	40·1	39·7	14·9	6·61	8·3
Weight of Bursting Charge	Armour - piercing Shell, in lbs.	7·7	..	..	5·3	5·3	5·3	7·05	7·05	6·6	3·2	5·5	5·5	1·3	1·5	0·8	0·8	0·8	..	..	..	..	..
	Common Shell, in lbs.	19·8	25·4	25·4	14·3	14·3	22·0	16·5	16·5	15·4	15·4	12·1	12·1	5·1	4·3	4·2	4·2	4·2	2·4	0·9	0·4	..	0·6
Weight of Firing Charge	Armour - piercing Shell, in lbs.	202·8	352·7	297·6	105·8	105·8	125·7	..	..	152·1	67·2	103·6	103·6	30·9	33·1	14·3	17·1	17·1	..	..	..	..	..
	Common Shell, in lbs.	202·8	352·7	297·6	105·8	105·8	125·7	..	..	152.1	50·7	103·6	103·6	30·9	33·1	14·3	17·1	17·1	8·8	8·8	3·3	0·88	0·9
Initial Velocity	Armour - piercing projectile, ft.-sec.	1713	2362	2133	1588	1588	1578	2067	1903	1657	1493	1739	1657	1608	1624	1463	1463	1463	..	..	..	..	..
	Common shell, ft.-sec.	1713	..	..	1641	1641	1654	2067	1903	1657	1391	1739	1657	1654	1624	1555	1555	1555	1545	1526	1545	1545	1053
Muzzle Energy	Total, foot-tons	14,750	21,750	17,740	7211	7211	7119	14050	11910	9024	4736	6471	5876	2112	2055	1131	1131	1131	..	..	..	..	..
	Per in. circ., ft.-tons	391	628·4	512·4	223	223	220	473·3	401·2	304	161	250·0	227	98·9	111·5	61·3	61·3	61·3	..	..	..	..	..
Perforation at Muzzle, in ins.		20·5	‖30·7	‖26·3	15·4	15·4	15·3	‖26·8	21·0	18·1	13·0	16·4	15·6	10·3	11·0	8·0	8·0	8·0	..	..	..	..	..

NOTE.—There are also quick-firing guns; see Table of Krupp Q.F. guns. * Maximum twist. † Including taper entrance into bore.
‡ In most cases steel shells. § Length including powder chamber. ‖ Iron by Krupp's formula. ¶ Boat gun for landing and working ashore.

ITALIAN NAVAL ORDNANCE.

	Armstrong Breech Loading.				B.L.	Armstrong Muzzle Loading.							Muzzle Loading. Old Pattern.		Breech Loading.		Armstrong Quick Firing.			
Designation by Calibre, in centimètres	43·1‡ New Pattern	43·1‡ Early Pattern. 1882.	34·3	12·0	12·0	45·0	27·9 New Pattern.	25·4 No. 1 Long.	25·4 No. 2 Short	25·4 No. 2.	22·8	20·3	16	16	7·5 No. 1.	7·5 No. 2.	15·2†	14·9	12·0*	12·0§
Calibre, in inches	17	17	13·5	4·72	4·72	17·72	11	10	10	10	9	8	6·5	6·5	3	3	6·0	5·87	4·7	4·7
Length — Total, in feet	40·75	39	36·09	8·5	9·25	32·7	14·4	14·4	14	13·8	13·8	10·8	11·8	10·6	5·8	3·3	13·8	13·87	16·2	13·0
Length — Rifled Bore, in inches	346·8	315·7	..	75	88	302	121	120	114	112	106	89	96	87	52	27	126	..	189	..
Length — Powder Chamber, in inches	84·5	98	..	10·8	22	56·5	24·5	26·0	26·0	14·0	19·5	15·7	21·3	21·3	10·2	7·9	28	..		..
Length — Bore, in Calibres	27	26	..	20·2	23·5	20·5	13·2	14·6	14·0	12·6	13·9	13·1	16·8	15·5	20·7	11·7	26	..	40	35
No. of Grooves	82	82	56	37	36	28	9	7	7	8	6	6	6	6	12	12	28	28	22	22
Twist of Rifling, in Calibres	50	50	..	40	42	50	35	40	40	55	45	45	42·5	27·3	48	48	40	40	34·4	..
Total Weight, in tons	104·3	101·5	67·9	1·20	1·38	100	25·0	18·0	18·1	12·1	12·6	6·99	5·12	3·54	0·29	0·095	4	4·2	2·05	1·69
Firing Charge — Armour-piercing projectile, lbs.	900·0	725	630·5	5·5	9·9	551	95·2	77·6		63·9	59·7	37·7	19·8	..	..	..	39 7	26·5	12·0	..
Firing Charge — Common Shell, "	600	480	..	5·5	9·9	63·0	66·6	52·9		41·9	37·7	26·7	7·3	7·1	1·9	0·7	26·5	40	12·0	..
Weight — Armour-piercing projectile, "	2000	2000	1250	52·0	52·2	2000	540·1	451·9		331·8	315·3	191·8	103·6	..	..	..	80	about 80·0	45·0	36·0
Weight — Common Shell, "	2000	2000	1250	31·7	36·8	2000	526·9	399·0		284·4	250·0	180·0	64·6	65·7	9·4	9·4	80		..	36·2
Weight — Shrapnel " "	2017	2017	1250	37·3	37·37	2180	533·5	399·0		284·4	250·0	180·0	68·3	..	9·4	9·4	80		..	29·8
Weight — Case Shot "	..	..	..	32·4	35·9	..	200·1	188·1		135·6	99·6	79·4	33·1	33·1	9·0	9·0	70	..	..	..
Bursting Charge — Armour-piercing projectile, "	32	32	17·4	2·31	2·31	32 ?	15·0	12·3		8·4	6·5	3·8	..	..	..	..	1·5	..	..	1·83
Bursting Charge — Common Shell, "	60	60	87·1	2·2	2·2	78 ?	26 0	23·8		18·2	18·8	9·7	2·87	2·87	0·31	0·31	5	..	..	3·02
Bursting Charge — Shrapnel " "	5	5	4·25	0·35	0·35	5 ?	2·2	2·20		1·96	1·80	1·17	0·55	..	0·03	0·03	0·16	..	..	0·35
Muzzle Velocity, in feet	1992	1935	2016	1345	1591	1700	1353	1388		1373	1284	1311	1290	1024	1335	..	1946	..	1786	..
Muzzle Energy — Total, foot-tons	55,030	51,930	35,230	650·4	916·4	40,060	6857	6035		4369	3604	2286	1195	..	..	..	2100	..	995·4	..
Muzzle Energy — Per inch circumference, foot-tons	1035	976·3	830·8	43·9	61·8	753·4	198·5	192·2		139·1	127·6	91·0	58·5	..	..	..	114·1	..	67·1	..
Perforation at Muzzle, inches of iron	33·7	32·8	30·2	6·7	8·1	28·5	14·3	14·1		12·0	11·4	9·6	7·7	..	..	..	11·2	..	8·6	..
Metal employed in structure	St.	I. & St.		St.	St.	Steel tube in Wrought Iron jacket.							I. & St.	Cast I.	Br.	Br.			St.	

St. stands for steel, I. for iron, Br. for Bronze.

* For Piemonte. † For Piemonte, Fieramosca, Re Umberto, Ancona, Doria.

‡ There are four types of these bores, viz.: types Lauria, Lepanto, Italia, Valente. § For Duilio, Dandolo, Formidabile. The Piemonte has a 40-calibre gun.

RUSSIAN NAVAL ORDNANCE.

	Obuchoff Steel Breech Loading Hooped Guns.																Steel B.L. Guns.		
Designation by Calibre, in inches	12	12 Long.	12 M. 77.	11 M. 67.	11 Pattern 77.	9	*a* 9 M. 67.	*b* 9	8	8	8 M. 67.	6 Long.	6	6·03	6	Long 9-pdr.	4·2 (9-pdr.)	3·43 Long (4-pdr.)	3·43 (4-pdr.)
Calibre in centimètres	30·48	30·48	30·48	27·94	27·94	22·86	22·86	22·86	20·32	20·32	20·32	15·24	15·24	15·32	15·24	10·67	10·67	8·70	8·70
Total Length, in feet	**35	30	20	18·3	20·0	**26·25	15·0	13	**23·33	**20	14·6	**17·5	14	12·2	11·7	6·9	7·0	6·9	5·8
Length of Rifled Portion of Bore, in inches	..	..	165·0	152·0	158·0	..	124·0	..	..	..	128·0	..	118·7	106·0	98·0	61·5	65·0	62·6	53·0
Length of Powder Chamber, in inches	..	..	38·5	35·0	50·4	..	28·5	..	..	..	23·0	..	30·5	22·4	22·2	10·5	8·0	10·7	..
Length of Bore in calibres, including Powder Chamber	**35	..	17	17	18·9	**35	16·9	..	**35	**30	18·9	**35	24·9	21·3	20	17·1	17·4	21·4	..
Number of Grooves, in inches	..	..	36	36	64	..	32	32	..	..	30	..	..	24	24	24	16	24	12
Depth of Grooves "	..	0·070	0·135	0·135	0·135	..	0·110	0·110	..	..	0·090	..	0·060	0·085	0·070	0·055	0·055	0·050	0·050
Twist of Rifling in calibres	..	..	73·5	70	..	..	60	60	..	..	70	..	*24	60	68	*40	50	40	41
Total Weight, in tons	55·7	50·45	39·9	28·2	28·2	19·44	15·0	12·5	13·64	12·74	9·65	6·26	4·08	4·35	4·03	0·60	0·87	0·45	0·35
Weight of — Steel Shell, in lbs.	..	..	665·8	515·9	..	..	249·1	275·6	..	..	172·0	..	90·9	97·6	86·0	..	..	..	..
Weight of — Chilled Shell, "	..	731·9	665·8	515·9	562·2	..	275·6	264·7	..	193·1	169·8	..	119·0	86 0	86·0	..	..	..	..
Weight of — Common Shell, "	626·4	..	639·3	496·0	520·3	268·2	266·8	266·8	192·3	172·4	172·0	73·35	..	81·6	81·6	27·6	24·2	15·2	12·6
Weight of — Case Shot, "	..	..	293·2	216·1	..	..	176·4	176·4	..	..	134·5	..	..	57·3	57·3	27·6	22·3	15·2	11·0
Weight of Firing Charge. — Steel Shell, "	..	..	144·4	115·3	..	..	64·2	47·0	..	..	31·5	89·38	..	14·3	18·1	..	..	..	..
Weight of Firing Charge. — Chilled Shell, "	..	246·9	144·6	90·6	132·2	..	47·0	47·0	..	72·0	29·3	39·6	37·8	14·3	18·1	..	..	..	..
Weight of Firing Charge. — Common Shell, "	..	..	117·3	81·6	132·2	180	42·1	42·1	88·2	72·0	28·4	39·6	..	10·8	14·3	4·5	2·6	3·1	1·3
Muzzle Velocity, in feet	..	1942	1470	1486	1516	2376	1463	1260	1925	1796	1352	2080	‡1739	1206	1463	1225	..	1444	..
Muzzle Energy — Total, foot-tons	..	19140	9974	7903	8960	10500	4095	3035	..	4321	2180	2682	1905	982	1276	..	..	..	..
Muzzle Energy — Per Inch Circumference, foot-tons	..	508·4	264·6	228·8	259·3	371·4	144·7	107·4	..	172·0	86·7	142·3	101·1	51·8	67·74	..	..	..	..
Perforation † at Muzzle, in inches	..	23·6	16·7	15·5	16·5	20·2	12·3	10·5	..	13·5	9·5	12·50	10·5	7·2	8·4	..	..	..	..

** It is doubtful if this refers to the total length of gun or of bore. * Maximum of increasing twist. † Through iron unbacked.
‡ With pyroxiline. *a* New. *b* Converted. There exist also 15 and 10·7-cm. Krupp guns.
NOTE.—The Russians certainly possess some more powerful pieces than are here shown.

SPANISH NAVAL ORDNANCE.

		Hontoria, Pattern 79.		Hontoria, Pattern 83.								Armstrong, Pattern 83.						Armstrong.			Krupp.				Ordonnez.	
		B.L.		Breech Loading.														Muzzle Loading.		Pattrn. 81 B.L.	Breech Loading.				B.L.	
Designation by Calibre		18-cm	16-cm No. 1.	32-cm.	28-cm.	24-cm.	20-cm.	18-cm	16-cm.	14-cm	12 cm.	24-cm.	20·3-cm	15-cm.	12-cm.	8·4-cm	7·5-cm long.	22·86-cm	20·3-cm	6-in.	15-cm.	12-cm.	8·7-cm	7·5-cm	24-cm.	21-cm.
Calibre, in inches		7·09	6·34	12·60	11·02	9·45	7·87	7·09	6·34	5·51	4·72	9·449	8·00	6·00	4·72	3·3	2·95	9·00	8·00	6 00	5·87	4·72	3·43	2·95	9·45	8·27
Length	Total length, in feet	15·57	13·8	38·7	33·8	29·0	..	21·75	19·3	16·91	14·5	29	18·4	17·00	13·75	7·9	7·51	13·0	11·9	14·5	17·13	11·81	6·9	6·3	..	..
	Rifled Portion, in inches	141·2	125·6	352·4	309·1	..	..	..	170·6	149·1	126·0	260·2	162·0	158·3	135·8	75·0	70·7	104·0	102·0	126·9	..	..	..	57·6	..	..
	Powder Chamber, in inches	..	31·9	86·8	77·1	..	..	..	49·8	53.9	39·4	66·9	43·5	31·4	19	13	13	..	..	29·7	..	..	..	..	35	35
	Bore, in calibres.	..	25	50	50	30	..	30	35	35	35	35	26	32	33	27	28·7	14	14·75	26·1	35*	30*	24*	25·8*	..	..
No. of Grooves		42	38	80	70	60	50	45	40	35	30	60	33	28	22	20	18	6	4	28	36	32	24	24	..	..
Depth of Grooves, in inches.		0·06	0·06	0·06	0·06	0·05	0·06	0·04	0·04	0·04	0·04	0·05	0·03	0·037	0·03	0·03	0·03	0·18	0·18	..	0·06	0·06	0·05	0·05	..	..
Twist of Rifling, in calibres.			Increasing from 10 to 49.	From 0 to 30.								30	45	30	40	30	35	45	40	100 to 40	25	25	40	36	24·3	16·3
Total Weight, in tons		7·87	5·6	48·2	32·5	20·7	11·5	8·77	6·1	4·1	2·6	21	11·5	5·0	2·2	0·45	0·35	12·5	9·0	4·0	4·6	2·1	0·49	0·30	..	..
Weight	Armour-piercing projectile, in lbs	135·6	93·7	1041	837·8	438·7	253·5	187·4	130·1	86·0	53·1	445	180	100·0	40·0	..	..	2500	180·0	78·0	85·10	43·65	..	..	429·9	286·6
	Common Shell, in lbs.	120·4	78·3	879·6	586·4	370·4	..	..	112·4	75·0	47·2	393	180	100·0	40·0	15·0	12·0	2500	180·0	83·6	65·70	34·61	14·6	9·48	..	..
	Ring Segment, in lbs.	..	83·8	886·3	590·8	370·4	..	..	112·4	75·0	47·6	..	..	..	40·0	15·0	12·0	..	..	..	..	34·61	14·6	9·04	..	..
Firing Charge	Armour-piercing projectile, in lbs.	..	26·5	485·0	352·7	220·5	127·9	94·8	66·1	44·1	28·7	220	90	55·0	16·0	..	..	50·0	35·0	34·0	37·48	19·29	..	..	154·3	99·21
	Other projectiles	..	24·3	..	..	..	..	..	61·7	..	28·7	145	65	34·0	12·0	4·0	3·75	33·0	21·0	39·0	..	..	10·3	10·4	..	..
Muzzle Velocity, in feet		..	1631	2034	2034	2034	..	2034	2028	2034	1988	1950	2020	2070	2000	1625	1709	..	..	1936	2001	1887	1539	1552	1772	1706
Muzzle Energy	Total, in foot-tons	..	1729	29850	2403	12580	..	5374	37·10	2466	1511	11730	5094	2972	1109	275	243	..	..	2027	2362	1076	..	..	9363	5782
	Per inch circumference, foot-tons	..	87·4	754·3	694·0	423·9	..	241·4	186·3	142·4	101·9	397·4	203·8	156·4	75·15	..	..	..	..	1075	128·1	72·6	..	..	315·4	222·6
Perforation at Muzzle, in inches		..	9·6	28·8	27·6	21·6	..	16·3	14·3	12 5	10·5	20·9	15·0	13·22	9·09	..	..	..	..	10·9	11·9	8·93	..	..	16·9	14·2
Metal and Construction		St. & Cast I		St. Jacket and Hoops.								St.						St. and Wt. I.		St.	St.				St.	

18 and 16-cm. Palliser guns and 16 and 13-cm. Parrot guns also exist. St. stands for Steel; I. for Iron. There is also a 20-cm. (7·87-in.) B.L. Hontoria, Pattern 79, weighing 10·8 tons, firing an armour-piercing projectile weighing 180·8 lbs. with a charge of 61·73 lbs., and an Ordonnez 30·5-cm. (12·0-in.) gun, firing an 838-lb. projectile with a velocity of 1706 ft.-secs., as well as two lighter pieces.

* Total length, the length of bore not being supplied.

NAVAL ORDNANCE OF SWEDEN AND NORWAY.

	Sweden.													Norway.										
	Breech Loaders.			Model 76.		Model 81.		Model 83.		M. 85.	M. 86.	M. 89.	M. L	Krupp, B.L.					Armstrong, M.L.				Palliser, M.L.	
Designation by Calibre, in cms.	27	24	17	27	24	27	12	15	8	25	6·5	15	12	26	26	15	12	12	26·7	26·7	26·7	20·2	16·7	15·5
Calibre, inches	10·80	9·45	6·58	10·80	9·45	10·80	4·72	6·00	3·31	10·00	2·60	6·0	4·80	No. 2. 10·24	No. 1. 10·24	5·91	No. 2. 4·72	No. 1. 4·72	No. 3. 10·51	No. 2. 10·51	No. 1. 10·51	7·94	6·58	6·11
Total Length, feet	17·46	14·96	11·27	17·65	16·24	23·10	10·29	13·87	7 37	28·33	3·79	16·98	8·87	25·59	18·77	12·63	13·78	9·60	16·87	14·65	13·45	10·82	11·58	10·30
Length — Rifled Portion of Bore, ins.	160·8	137·0	107·8	159·2	150·5	191·6	94·5	124·1	71·3	2609	35·0	155·2	83·3	218·9	160·4	112·4	128·6	85·9	138·7	121·0	110·6	85·7	92·4	91·7
Length — Chamber, "	29·9	25·9	16·5	32·3	28·1	66·2	20·6	31·1	9·7	58·1	4·2	35·2	13·6	55·4	34·1	22·6	36·8	16·5	36·8	24·0	20·6	18·5	19·3	10·8
Length — Bore in calibres, "	17·2	17·1	18·7	17·8	18·9	23·9	24·0	25·7	24·3	32·9	15·4	32	20·2	30	19·0	22·8	35	25	16·7	13·8	12·5	13·2	17·0	16·8
Number of Grooves	5	5	5	42	36	45	30	28	24	42	26	28	8	60	60	36	32	32	8	8	8	6	3	3
Twist of Rifling	30*	30*	30*	45*	..	40*	30*	30	33*	40*	22*	30	40	∝25	45	45	∝25	40	55	55	55	50	34	34
Total Weight, tons	23·6	14·4	5·2	23·6	16·4	27·1	1·9	4·2	4·2	29·8	9·4	5·2	1·9	24·8	21·7	3·9	2·31	1·38	21·7	19·7	18·2	7·4	4·9	3·4
Weight of — Armour-piercing Shell in lbs.	476·2†	317·5†	107·1†	476·2†	317·5†	476·2†	..	100·0	..	449·7	..	100	..	606·3	463·0	86·0	57·3	44·1	448·6	393·5	384·9	157·4	109·8	..
Weight of — Common Shell, in lbs.	396·8	224·9	97·7	396·8	273·4	396·8	48·5	100·0	14·8	401·2	6·2	100	34·6	606·3	381·4	69·4	57·3	36·1	316·4	316·4	316·4	153·9	82·7	59·1
Weight of Firing Charge — Armour-piercing Shell, in lbs.	83·8	59·5	22·0	90·4	56·2	206·4	..	35·3	..	242·5	..	54·0	..	191·8	99·2	22·0	19·8	9·9	110·2	82·7	66·1	29 8	22·0	..
Weight of Firing Charge — Common Shell, lbs.	83·8	59·5	22·0	90·4	56·2	145·5	16·0	35·3	3·3	242·5	0·9	..	6·6	191·8	81·6	20·9	19·8	9·9	77·2	77·2	48·5	29·8	16·5	7·72
Muzzle Velocity, feet.	1322	1312	1365	1378	1365	1788	1640	1663	1542	2100	1148	2067	..	1722	1575	1624	1804	1493	1549	1444	1296	1247	1329	1116
Total foot-tons	5771	3789	1384	6272	4102	10550	..	1918	..	13750	..	2964	..	12460	7966	1573	1290	680	7463	5692	4484	1696	1345	..
Muzzle Energy — Per inch Circumference.	170·1	127·6	66·9	184·9	138·2	311·3	..	101·7	..	437·7	..	157·2	..	387·4	247·7	84·7	87·1	45·9	226·0	172·4	135·8	68·0	65·1	..
Muzzle Energy — Perforation through Iron	13·19	11·4	8·3	13·8	11·9	18·4	..	10·4	..	21·9	..	13·1	..	20·4	16·2	9·5	9·7	7·0	15·5	13·4	11·8	8·3	8·2	..

Sweden.—The breech-loaders have breech screw-stoppers. The whole of the guns which do not fire shrapnel, discharge case-shot.

Norway.—Besides the chilled shell, there are also chilled solid shot for the 26·7-cm. and the 20·2-cm. guns, and for all muzzle-loaders case-shot also, and steel shrapnel for some Krupp guns.

* Maximum rate of increasing twist. † The 16·7 muzzle-loading gun fires steel solid shot.

UNITED STATES NAVAL ORDNANCE.

NATURE OF GUN.	Calibre.	Weight.	Total Length.	Total Length of Bore.	Length of Rifling.	Twist of Rifling.	Length of Chamber.	Weight of Service-charge (not Smokeless Powder.)	Weight of Projectile.	Muzzle Velocity (Service).	Muzzle Energy.	Perforation of Wrought Iron at Muzzle.†
	inch.	tons.	feet.	inch.	inch.		inch.	lbs.	lbs.	ft.-seconds.	ft.-tons.	inch.
4-in. B.L.R., Mark I.	4	1·5	13·7	157·3	130·3	zero to 1 in 25	24·7	12 to 14	33	2000	915	10·1
4-in. R.F.* Gun	4	1·5	13·7	157·5	128·1	..	25·4	..	33	2000	..	10·1
5-in. B.L.R., Mark I.	5	2·8	13·5	150·3	120·8	1 in 180 to 1 in 30	27·1	26 to 29	60	2000	1,660	12·0
5-in. R.F.* Gun	5	3·1	17·4	191·5	164·4	zero to 1 in 25	32·0	28 to 30	50	2300	1,834	13·0
6-in. B.L.R., Mark I.	6	4·8	15·8	176·0	136·7	1 in 180 to 1 in 30	36·9	50	100	2000	2,773	..
6-in. B.L.R., Mark II.	6	4·9	16·1	180·1	144·9	..	32·7	45 to 48	100	2000	..	14·0
6-in. B.L.R., Mark III., of 30 Cals.	6	4·8	16·3	183·8	147·3	zero to 1 in 25	34·0	44 to 47	100	2000	..	..
6-in. B.L.R., Mark III., of 35 Cals.	6	5·2	18·8	213·8	177·3	..	34·0	..	100	2080	2,990	14·8
6-in. B.L.R., Mark III., of 40 Cals.	6	6·0	21·3	243·8	207·3	..	34·0	..	100	2150	3,204	15·6
8-in. B.L.R., Mark I.	8	{12·3 / 12·9}	21·5	239·9	195·2	1 in 180 to 1 in 30	42·1	105 to 115	250	2000	6,932	19·4
8-in. B.L.R., Mark II.	8	13·0	21·5	239·9	195·2	..	42·1	..	250	2000	..	19·4
8-in. B.L.R., Mark III., of 35 Cals.	8	13·1	25·4	290·5	242·8	zero to 1 in 25	45·1	..	250	2080	7,498	20·6
8-in. B.L.R., Mark III., of 40 Cals.	8	15·2	28·7	330·5	282·8	..	45·1	..	250	2150	8,011	21·6
10-in. B.L.R., Mark I., of 30 Cals.	10	25·7	27·4	306·3	247·3	1 in 180 to 1 in 35	57·2	225 to 240	500	2000	13,864	24·0
10-in. B.L.R., Mark I., of 35 Cals.	10	{27·1 / 28·2}	30·5	343·8	283·7	zero to 1 in 25	57·2	..	500	2060	14,709	25·8
10-in. B.L.R., Mark II., of 30 Cals.	10	25·1	27·4	307·3	247·3	zero to 1 in 26·8	57·2	..	500	2000	13,864	24·0
10-in. B.L.R., Mark II., of 35 Cals.	10	27·6	31·2	354·9	294·9	zero to 1 in 25	57·2	..	500	2100	15,285	26·6
12-in. B.L.R., Mark I.	12	45·2	36·8	419·2	343·1	..	74·1	425	850	2100	25,985	31·5
13-in. B.L.R., Mark I.	13	60·5	40·0	454·5	370·5	..	80·9	550	1100	2100	33,627	34·6

* R.F., Rapid or Quick-fire. † By Krupp's formula.

NOTE.—The weight of fixed ammunition for R.F. 4-in. and 5-in. guns is 58 and 95 lbs. respectively.

ELSWICK QUICK-FIRING GUNS.

This Table is supplied by the Manufacturers. The entire Table refers to existing guns.

	Automatic Machine gun											Field and Naval																	
Diameter of Bore, ins.	1·46	1·46	1·46	1·46	1·65	1·85	1·85	2·244	2·244	2·244	2·244	3·0	3·0	3·5	4		4		4·7	4·7	4·7	6	6	6	6	† 8		† 8	
	Maxim Nordenfelt	Hotchkiss	Hotchkiss		Maxim Nordenfelt	Hotchkiss	Maxim Nordenfelt	Maxim Nordenfelt	Maxim Nordenfelt	Hotchkiss	Hotchkiss																		
do. do. m.m.	37	37	37	37	42	47	47	57	57	57	57	76·2	76·2	88·9	100		100		120	120	120	152	152	152	152	203		203	
Length of Bore, cals.	29·9	20	25	45	41·75	40	45·4	42·3	43·5	40	50	28	40	40	40		48·7		40	43·9	48·9	40	40	45	50	40		44·6	
do. Gun, do.	..	22·7	27·8	46·7	46·2	43·6	..	..	..	43·6	53·6	29·2	41·2	41·3	41·3		50		41·1	45	50	41·54	41·54	46·54	51·54	41·63		46·3	
Weight of Gun	lbs. 458	lbs. 73	lbs. 79	lbs. 268	lbs. 379	506	lbs. 532	lbs. 700	lbs. 756	lbs. 800	cwts. 10	cwts. 7·5	cwts. 12·0	cwts. 24	cwts. 32		cwts. 36		cwts 42	cwts. 53	cwts. 55	tons. 5·8	tons 6·6	tons. 7	tons. 7·6	tons. 15·5		tons. 19·9	
do. Projectile, lbs.	1·0	1·1	1·1	1·5	2·5	3·3	3·3	6	6	6	6	12·5	12·5	20	25	30	25	30	45	45	45	100	100	100	100	210	250	210	250
do. Charge, lbs.	oz. grs 1·96	ozs 1·25	ozs. 1·25	ozs. 4·5	..	ozs. 6·8	ozs. 9·5	ozs. 12·5	lb. 1·0	ozs. 7·75	..	ozs. 13·5	lbs. 1·62	lbs. 3·75	lbs. 5	lbs 5	lbs. 5	lbs. 5	lbs. 5·5	lbs. 8·4	lbs. 8·4	lbs. 15	lbs. 19·5	lbs. 19·5	lbs. 19·5	lbs. 32	lbs. 32	lbs. 46	lbs. 46
Muzzle Veloci'y, f.-s.	1800	1319	1460	2300	2010	2002	2300	2300	2400	1940	2592	1585	2200	2420	2540	2325	2650	2430	2150	2570	2630	2220	2500	2570	2642	2242	2068	2650	2480
Velocity at 2,500 Yards, f.-s.	600	570	595	732	896	903	966	1060	1094	966	1172	904	1084	1256	1251	1351	1386	1412	1275	1518	1564	1517	1706	1756	1506	1626	1582	1918	1886
Muzzle Energy, f.-t.	22·5	13·3	18·3	55·0	70·0	91·7	121·0	220	240	156·6	279·5	217·8	419·5	812·2	1118	1124	1217	1228	1442	2061	2158	3417	4334	4580	4840	7319	7413	10226	10662
Energy at 2,500 Yards, f.-t.	..	..	..	..	13·9	18·7	21·3	46·7	49·8	38·8	57·2	70·8	102	219	271	380	333	415	507	719	763	1596	2018	2138	2262	3850	4339	5357	6166
Penetration at Muzzle ‡ ins.	2·2	1·5	1·7	4·3	4·4	4·7	5·8	7·2	7·6	5·5	8·6	4·9	8·1	10·9	11·7	11·8	12·5	12·5	11·6	15·2	15·7	16·4	19·5	20·7	21·2	20·2	20·2	26·1	27·1
Rounds per Minute	250	..	..	25	32	30	30	28	28	25	25	20	20	15	15	15	15	15	10	10	10	7	7	7	7	4	3	4	3

† No cartridge case used. ‡ Worked out by compiler, on Krupp's formula.

SOME RESULTS ACTUALLY OBTAINED.

4·7-inch 42 cwt. gun, with single motion breech mechanism, 5 rounds in 22 seconds, at Silloth, at a target, 2 hits, range 1,000 yards; 7 rounds in 25 seconds at drill.

6-inch Admiralty gun, with three-motion breech mechanism, and E.X.E. powder, 10 rounds in 85 seconds, at sea, on board gunboat *Kite*; 18 rounds in 3 minutes, H.M.S. *Royal Arthur*, 14 hits on target, ship steaming 8 knots, range from 1,600 to 2,200 yards; *18 rounds in 3 minutes, H.M.S. *Blake*, 15 hits on target, ship steaming 8 knots, range from 1,600 to 2,200 yards.

* Total number of rounds fired from 10 guns in same time 148, of which 110 hit the target.

6-inch 6·6-ton gun, with single motion breech mechanism, 7 rounds in 61 seconds, at Silloth, cordite charge; 4 rounds in 20 seconds, at drill.

8-inch 15·5-ton gun, with single motion breech mechanism, 3 rounds in 28 seconds, at drill; 4 rounds in 62 seconds, on board cruiser *Blanco Encalada*, ammunition supplied from magazine.

13·5-inch 68-ton B.L. gun, with hydraulic breech mechanism, 7 rounds in 12 minutes, H.M.S. *Royal Sovereign*, 6 hits on target, ship steaming 8 knots, range from 1,600 to 2,200 yards; 4 rounds in 6 minutes, H.M.S. *Empress of India*, with an interval between rounds of only 1 minute 27 seconds.

12-inch 46-ton B.L. gun, interval between 2 rounds, 1 minute 19 seconds, H.M.S. *Majestic*.

NOTE.—Although special arrangements and automatic gear are applied to heavy pieces, including the 12-in. gun, the projectiles are too heavy for rapid handling, and no piece exceeding 8 inches calibre is classed under the category of Q.F. guns at Elswick.

SCHNEIDER - CANET QUICK - FIRE GUNS. Model 1896.

Existing guns, or guns which differ very little from such as have been constructed, are denoted by an asterisk.

This Table is supplied by the Manufacturers.

Calibre, in centimètres	24			21			16		
Calibre, in inches	9·45			8·27			6·30		
Length, in calibres	40	45	50	40	45	50	*45	50	60
Length, in feet	31·5	35·4	39·4	27·6	31·0	34·4	23·6	26·2	31·5
Weight of Gun, in tons	20·7	22·5	26·1	13·9	15·1	17·5	7·28	7·73	8·56
Weight of Projectile, in lbs.	330·7			242·5			101·4		
Muzzle Velocity, in ft.-secs.	2493	2625	2756	2493	2625	2756	2625	2756	2953
Velocity at 2000 mètres, in ft.-secs.	1969	2074	2182	1900	2001	2106	1867	1956	2103
Muzzle Energy, in ft.-tons	14258	15799	17418	9506	10533	11621	4846	5341	6132
Energy at 2000 mètres, in ft.-tons	8887	9860	10917	5517	6141	6783	2451	2716	3111
Perforation at muzzle, in ins.†	30·3	33·8	35·4	26·0	28·1	30·2	21·1	22·8	25·3
" " " ‡	27·1	29·5	31·4	25·4	27·2	30·2	20·0	21·5	23·9
Perforation at 2000 mètres, in ins.†	21·1	22·8	24·7	17·4	18·5	20·0	12·5	13·5	15·0

Calibre, in centimètres	*15			14			12			
Calibre, in inches	5·91			5·51			4·72			
Length, in calibres	*45	50	60	*45	50	60	*45	*50	60	80
Length, in feet	22·2	24·6	29·5	20·7	23·0	27·6	17·7	19·7	23·6	31·5
Weight of Gun, in tons	5·71	6·10	7·09	4·82	5·17	5·76	2·85	3·15	3·64	6·15
Weight of Projectile, in lbs.	88·2			70·5			46·3			
Muzzle Velocity, in ft.-secs.	2625	2756	2953	2625	2756	2953	2625	2756	2953	3281
Velocity at 2000 mètres, in ft.-secs.	1860	1955	2093	1818	1913	2047	1719	1811	1939	2152
Muzzle Energy, in ft.-tons	4211	4645	5332	3371	3716	4265	2212	2439	2799	3455
Energy at 2000 mètres, in ft.-tons	2116	2339	2679	1616	1790	2051	949	1054	1201	1487
Perforation at muzzle, in ins.†	20·4	22·0	24·5	18·7	20·1	22·3	16·1	17·4	19·3	22·6
" " " ‡	19·5	21·0	23·3	18·0	19·4	21·5	15·9	17·1	19·0	22·3
Perforation at 2000 mètres, in ins.†	12·0	13·0	14·2	10·6	11·5	12·7	8·4	9·1	10·1	11·9

Calibre, in centimètres	10				9			75 mm.		
Calibre, in inches	3·94				3·90			3·03		
Length, in calibres	*45	*50	*60	*80	50	60	80	*50	60	80
Length, in feet	14·8	16·4	19·7	26·2	14·8	17·7	23·6	12·3	14·8	19·7
Weight of Gun, in tons	1·77	1·89	2·12	3·54	1·38	1·57	2·56	0·79	0·89	1·53
Weight of Projectile, in lbs.	28·7				22·0			13·2		
Muzzle Velocity, in ft.-secs.	2625	2723	2920	3215	2690	2887	3182	2658	2854	3150
Velocity at 2000 mètres, in ft.-secs.	1640	1703	1831	2011	1640	1755	1939	1496	1668	1775
Muzzle Energy, in ft.-tons	1369	1474	1696	2055	1107	1275	1549	648	748	910
Energy at 2000 mètres, in ft.-tons	525	576	666	804	411	471	574	205	237	289
Perforation at muzzle, in ins.†	13·7	14·9	16·1	18·7	13·2	14·7	17·1	10·8	12·0	14·0
" " " ‡	14·0	14·7	16·4	18·9	12·0	13·4	15·5	11·0	12·3	14·2
Perforation at 2000 mètres, in ins.†	6·7	7·0	7·9	9·1	5·7	6·8	8·0	4·4	5·0	5·8

Calibre, in centimètres	*65			57		
Calibre, in inches	2·57			2·24		
Length, in calibres	*60	70	80	*60	70	*80
Length, in feet	12·8	14·9	17·1	11·2	13·1	15·0
Weight of Gun, in tons	0·64	0·79	0·94	0·59	0·69	0·79
Weight of Projectile, in lbs.	8·82			6·0		
Muzzle Velocity, in ft.-secs.	2658	2854	3150	2625	2822	3117
Velocity at 2000 mètres, in ft.-secs.	1394	1496	1650	1033	1083	1171
Muzzle Energy, in ft.-tons	432	498	607	284	329	401
Energy at 2000 mètres, in ft.-tons	119	137	167	44	48	57
Perforation at muzzle, in ins.†	9·3	10·4	12·1	7·8	8·8	10·2
" " " ‡	10·0	11·1	12·9	8·7	9·7	11·3
Perforation at 2000 mètres, in ins.†	3·4	3·9	4·4	1·9	2·0	2·3

† Through wrought iron, apparently calculated by De Marre's formula. ‡ Through wrought iron, by Krupp's formula.

* The compiler is responsible for the conversion of figures supplied into British units, and for the calculation of the perforations through wrought iron on Krupp's system.

KRUPP QUICK-FIRE GUNS.

Quick-Fire Guns of 40 and 50 calibres in length.

This Table is supplied by Manufacturers, who have indicated existing service-guns with an asterisk.

Calibre, in centimètres	4		4·7		5		5·3		5·7		6		7		7·5		8		8·4		8·7	
Calibre, in inches	* 1·57		* 1·85		* 1·97	*	* 2·09		* 2·24		* 2·36	*	* 2·76		* 2·95		3·15		* 3·31		* 3·43	*
Total Length, in feet	5·25	6·56	6·17	7·71	6·56	8·20	6·95	8·69	7·48	9·35	7·87	9·84	9·19	11·48	9·84	12·30	10·50	13·12	11·02	13·78	11·42	14·27
Length of Bore, in inches	56·9	72·6	67·5	86·0	72·0	91·7	76·4	97·2	82·1	104·5	86·6	110·2	100·8	128·4	108·3	137·8	115·8	147·2	121·9	154·9	126·4	160·6
Length of Gun, in calibres	40	50	40	50	40	50	40	50	40	50	40	50	40	50	40	50	40	50	40	50	40	50
Weight of Piece, in lbs.	216·1	238·1	352·7	388·0	423·3	467·4	504·9	555·6	628·3	692·2	731·9	806·9	1164·0	1280·9	1430·8	1576·3	1719·6	1913·6	2010·6	2215·6	2233·3	2460·3
Weight of Piece, in tons	..	..	..	..	..	..	..	..	0·28	0·31	0·33	0·36	0·52	0·57	0·64	0·70	0·77	0·85	0·90	0·99	1·00	1·10
Weight of Steel Projectile, in lbs.	1·94		3·53		3·97		4·50		5·60		6·53		10·36		12·74		14·45		17·90		19·89	
Weight of Charge, in lbs.	0·35		0·57		0·68		0·81		1·01		1·18		1·87		2·30		2·79		3·23		3·59	
Muzzle Velocity, in ft.-secs.	2379	2493	2379	2493	2379	2493	2379	2493	2379	2493	2379	2493	2379	2493	2379	2493	2379	2493	2379	2493	2379	2493
Muzzle Energy, in foot-tons	76	83	123	135	148	162	177	194	219	241	256	281	406	447	500	549	606	666	702	771	780	857
Perforation through Steel,† in ins.	3·31	3·54	3·90	4·17	4·17	4·45	4·49	4·76	4·80	5·12	5·08	5·43	5·98	6·42	6·46	6·89	7·05	7·40	7·28	7·80	7·64	8·11

Calibre, in centimetres	9		10·5		12		13		14		15		16		21		24	
Calibre, in inches	3·54		* 4·13		* 4·72		5·12		5·51		* 5·87	*	6·30		* 8·24		* 9.45	
Total Length, in feet	11·81	14·76	13·78	17·22	15·75	19·69	17·06	21·33	18·37	22·97	19·55	24·61	21·00	26·25	27·56	34·45	31·50	39·37
Length of Bore, in inches	131·1	166·5	153·6	194·9	176·4	223·7	190·2	241·4	205·4	260·5	218·4	279·0	234·5	297·5	307·5	390·2	350·4	444·9
Length of Gun, in calibres	40	50	40	50	40	50	40	50	40	50	40	50	40	50	40	50	40	50
Weight of Piece, in lbs.	2473·6	2724·9	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Weight of Piece, in tons	1·10	1·22	1·64	1·87	2·35	2·68	3·12	3·54	3·88	4·41	4·70	5·35	5·88	6·69	16·24	20·18	25·40	31·50
Weight of Steel Projectile, in lbs.	22·05		30·9		44·1		58·4		72·8		88·2		110·2		238·1–308·7	238·1–308·7	352·7–474·0	352·7–474·0
Weight of Charge, in lbs.	3·98		6·83		9·70		12·34		15·43		18·52		23·15		57·32	57·32	85·98	85·98
Muzzle Velocity, in ft.-secs.	2379	2493	2461	2625	2461	2625	2461	2625	2461	2625	2461	2625	2461	2625	2625–2297	2822–2461	2625–2297	2822–2461
Muzzle Energy, in foot-tons	865	950	1293	1475	1851	2107	2453	2791	3055	3476	3703	4213	4628	5266	11376–11293	13146–12962	16853–17340	19478–19905
Perforation through Steel,† in ins.	7·87	8·43	8·90	9·76	9·96	10·91	11·14	12·24	12·05	13·19	12·95	14·17	14·06	15·39	20·08–19·84	22·25–22·01	22·95–23·35	25·39–25·79

† Of medium hardness.

Table Relating to Conversion of Measures.

Length.

Metric to English. | English to Metric.

I. Mètres.	II. Yards.	III. Feet.	IV. Inches.	V. Yards.	VI. Mètres.	VII. Feet.	VIII. Mètres.	IX. Inches.	X. Centimètres.
1	1·0936	3·2809	39·37	1	0·91438	1	0·30479	1	2·5400
2	2·1873	6·5618	78·74	2	1·82877	2	0·60959	2	5·0799
3	3·2809	9·8427	118·11	3	2·74315	3	0·91438	3	7·6199
4	4·3745	13·1236	157·48	4	3·65753	4	1·21918	4	10·1598
5	5·4682	16·4045	196·85	5	4·57192	5	1·52397	5	12·6998
6	6·5618	19·6854	236·22	6	5·48630	6	1·82877	6	15·2397
7	7·6554	22·9663	275·60	7	6·40068	7	2·13356	7	17·7797
8	8·7491	26·2472	314·97	8	7·31507	8	2·43836	8	20·3196
9	9·8427	29·5281	354·34	9	8·22945	9	2·74315	9	22·8596

Explanation.—To convert any number from one measure to the other, take the values of the different multiples of 10 by shifting the position of the decimal point, and add together. Thus, find the number

of yards in 2354 mètres (see cols. I. & II.).	of feet in 12·4 mètres (see cols. I. & III.).	of inches in 30·5 centimètres (see cols. I. & IV.). Note, 1 m.=100 cm.	of mètres in 1026 yards (see cols. V. & VI.).	of mètres in 1742 feet (see cols. VII. & VIII.).	of centimètres in 17·72 ins. (see cols. IX. & X.)
mètres. yards. 2000=2187·3 300= 328·09 50= 54·68 4= 4·37	mètres. feet. 10 =32·809 2 = 6·562 0·4= 1·312	cms. inches. 30·0=11·811 ·5= ·197	yards. mètres. 1000=914·38 20= 18·29 6= 5·49	feet. mètres. 1000=304·79 700=213·36 40= 12·19 .2= 0·61	inches. cms. 10·0 =25·400 7·0 =17·780 0·7 = 1·778 ·02= ·051
∴ 2354=2574·44	∴ 12·4=40·683	∴ 30·5=12·008	∴ 1026=938·16	∴ 1742=530·95	∴ 17·72=45·009

Note.—A ready way of approximately converting all French measures into English inches is to multiply by 4 and apply the decimal point by common sense—Thus for a 15-cm. gun; 15 × 4 = 60. Now this Calibre cannot be 60 inches, nor can it be 0·6 inch; therefore it must be 6 inches. (The exact value is 5·906 in.)

Weight.

Metric to English. | English to Metric.

I. Kilogrammes.	II. Tons.	III. Pounds Avoirdupois.	IV. Grains Troy.	V Tons.	VI. Milliers.	VII. Pounds Avoirdupois.	VIII. Kilogrammes.	IX. Grains. Troy.	X. Gramme.
1	·000984	2·2046	15432·3	1	1·016	1	0·4536	1	·0648
2	·001968	4·4092	30864·7	2	2·032	2	0·9072	2	·1296
3	·002953	6·6139	46297·0	3	3·048	3	1·3608	3	·1944
4	·003937	8·8185	61729·4	4	4·064	4	1·8144	4	·2592
5	·004921	11·0231	77161·7	5	5·080	5	2·2680	5	·3240
6	·005905	13·2277	92594·1	6	6·096	6	2·7216	6	·3888
7	·006889	15·4323	108026·4	7	7·112	7	3·1751	7	·4536
8	·007874	17·6370	123458·8	8	8·128	8	3·6287	8	·5184
9	·008858	19·8416	138891·1	9	9·144	9	4·0823	9	·5832

Explanation.—To convert any number from one measure to the other, take the values of the different multiples of 10 by shifting the position of the decimal point, and add together. Thus, find the number

of tons in 35 milliers (see cols. I. & II. Note, 1000 kg. =1 millier).	of pounds in 56·3 kilogrammes. (see cols. I. & III.).	of grains in 120 grammes (see cols. I. & IV. Note, 1000 grms. = 1 kg.)	of milliers in 38 tons (see cols. V. & VI.).	of kilogrammes in 68 pounds (see cols. VII. & VIII).	of grammes in 85 grains (see cols. IX. & X.).
milliers. tons. 30 = 29·53 5 = 4·92	kgrms. lbs. 50 =110·231 6 = 13·228 0·3= ·661	grammes. grains. 100=1543·23 20= 308·65	tons. milliers. 30 = 30·48 8 = 8·13	lbs. kgs. 60 = 27·216 8 = 3·629	grains. grammes. 80 = 5·184 5 = 0·324
∴ 35 = 34·45	∴ 56·3=124·120	∴ 120=1851·88	∴ 38 = 38·61	∴ 68 = 30·845	∴ 85 = 5·508

Note.—7000 grains troy=1 pound avoirdupois.

PRESSURE.

Metric to English.			English to Metric.				Atmospheric to English.		English to Atmospheric.	
I. Kilogrammes per square centimètre.	II. Pounds per square inch.	III. Tons per square inch.	IV. Pounds per square inch.	V. Kilogrammes per square centimètre.	VI. Tons per square inch.	VII. Kilogrammes per square centimètre.	VIII. Atmospheres.	IX. Tons per square inch.	X. Tons per square inch.	XI. Atmospheres.
1	14·223	·00635	1	·07031	1	157·49	1	·00656	1	152.38
2	28·446	·01270	2	·14062	2	314·99	2	·01313	2	304·76
3	42·668	·01905	3	·21093	3	472·48	3	·01969	3	457·14
4	56·891	·02540	4	·28124	4	629·97	4	·02625	4	609·52
5	71·114	·03175	5	·35155	5	787·47	5	·03281	5	761·91
6	85·337	·03810	6	·42186	6	944·96	6	·03938	6	914·29
7	99·560	·04445	7	·49217	7	1102·45	7	·04594	7	1066·67
8	113·783	·05080	8	·56248	8	1259·95	8	·05250	8	1219·05
9	128·005	·05715	9	·63279	9	1417·44	9	·05906	9	1371.43

Note.—One atmosphere is taken to be 14·7 lbs. per square inch.

Explanation.—To convert any number from one measure to the other, take the values of the different multiples of 10 by shifting the position of the decimal point, and add together. Thus, find the number

of pounds per square inch in 32·1 kilogrammes per square centimètre (see cols. I. & II.).	of tons per square inch in 3210 kilogrammes per square centimètre (see cols. I. & III.).	of kilogrammes per square centimètre in 15 lbs. per square inch (see cols. IV. & V.).	of kilogrammes per square centimètre in 18·3 tons per square inch (see cols. VI. & VII.).	of tons per square inch in 3254 atmospheres. (see cols. VIII. & IX.).	of atmospheres in 14·6 tons per square inch (see cols. X. & XI.).
kgs. per sq. cm. — lbs. per sq. in. 30 = 426·68 2 = 28·45 0·1 = 1·42 32·1 = 456·55	kgs. per sq. cm. — tons per sq. in. 3000 = 19·05 200 = 1·27 10 = ·06 ∴ 3210 = 20·38	lbs. per sq. in. — kgs. per sq. cm. 10 = ·7031 5 = ·3516 ∴ 15 = 1·0547	tons per sq. in. — kgs. per sq. cm. 10 = 1574·9 8 = 1259·95 0·3 = 47·25 ∴ 18·3 = 2882·10	atmospheres. — tons per sq. inch. 3000 = 19·69 200 = 1·31 50 = ·33 4 = ·03 ∴ 3254 = 21·36	tons per sq. in. — atmospheres. 10 = 1523·8 4 = 609·5 0·6 = 91·4 ∴ 14·6 = 2224·7

ENERGY.

Metric to English.		English to Metric.	
I. Mètre-tons.	II. Foot-tons.	III. Foot-tons.	IV. Mètre-tons.
1	3·2291	1	0·3097
2	6·4581	2	0·6194
3	9·6872	3	0·9291
4	12·9162	4	1·2388
5	16·1453	5	1·5484
6	19·3743	6	1·8581
7	22·6034	7	2·1678
8	25·8324	8	2·4775
9	29·0615	9	2·7872

1 mètre-ton is termed a "dinamode" in Italy.

Explanation.—To convert any number from one measure to the other, take the values of the different multiples of 10 by shifting the position of the decimal point, and add together. Thus find the number

of foot-tons in 4367 mètre-tons (see cols. I. & II.).	of mètre-tons in 3592 foot-tons (see cols. III. & IV.).
mètre-tons. — foot-tons. 4000 = 12916·2 300 = 968·72 60 = 193·74 7 = 22·60 ∴ 4367 = 14101·26	foot-tons. — mètre-tons. 3000 = 929·1 500 = 154·84 90 = 27·87 2 = ·62 ∴ 3592 = 1112·43

PERFORATION THROUGH IRON AND STEEL WITH THE FACE NOT HARDENED.

To obtain perforation through steel equivalent to a given perforation through iron, and *vice versâ*.

1 inch steel = $1\frac{1}{4}$ inches iron;

that is, 4 inches steel = 5 inches iron.

Thus, given 9·4 inches perforation through iron,

$$9{\cdot}4 \times \frac{4}{5} = 7{\cdot}52 \text{ inches steel;}$$

or, given 5·2 inches steel,

$$5{\cdot}2 \times \frac{5}{4} = 6{\cdot}5 \text{ inches iron.}$$

PART IV.

STATISTICS, OFFICIAL STATEMENTS AND PAPERS.

Statement of the First Lord of the Admiralty explanatory of the Navy Estimates for 1897–98.

The Navy Estimates for 1897–98 amount to a net total of £21,838,000, as against £21,823,000 in 1896–97.

The progressive increase in the *personnel* is reflected in nearly every Vote which is concerned with officers, men and boys. Naturally it is not only in the Vote for Pay that more funds are required. The Victualling Vote, the Medical Vote, the Educational Vote, show an increase, and with the steady but inevitable growth of the Non-effective Votes, the cost of the *personnel* exceeds by £344,400 the provision made for the same services in 1896–97. The Works Vote for the coming year exceeds that of previous years by £30,400, and certain Miscellaneous Votes show an aggregate increase of £19,400. The Ordnance Vote is £131,800 above that of the current year.

On the other hand Vote 8—the Shipbuilding Vote—shows a decrease of £511,000. In this connection it should be remarked that when the Programme of Shipbuilding was settled in February last, and its cost distributed over the three years, 1896–97, 1897–98, and 1898–99, the sum of £600,000 was transferred to the Estimates of the present year from the year 1897–98, in order to lighten the burden which would be thrown on that year, and at the same time to enable more rapid progress to be made in the realisation of the programme by the larger sum to be assigned to the first year. Taking the two years together there is no diminution in the amount assigned from the first to the programme now in execution, and to such new ships as it was foreseen would have to be laid down in the coming financial year.

Numbers.

The number of officers, seamen, boys, coastguard and royal marines voted for 1896–97 was 93,750, an increase on the previous year of 4,900. It must be clearly understood that this addition constituted a net increase, that is to say, an increase over and above the entries necessary to make good the annual waste in the various ratings.

The actual number borne on 1st January, 1897, was 92,322, and it is certain that the entries during the remaining months of the year will bring up the numbers borne on 31st March to the total authorised for 1896–97. While the numbers coming forward for most of the ratings have been most satisfactory, some difficulty has been experienced in obtaining the necessary number of engine-room artificers and artisans, owing to the general revival in the shipbuilding trade. This matter is receiving the close attention of the Board.

It is proposed to increase the numbers voted last year by 6,300, bringing up the total to 100,050.

The proposed additions are distributed as follows:—

121	Officers.
2,400	Seamen.
265	Engine-room Artificers.
2,000	Stokers.
1,000	Marines.
514	Artisans and Miscellaneous.
6,300	

The expansion of the Fleet has necessitated further additions to various classes of officers, and Orders in Council have been obtained authorising increases in the establishments as follows:—

Medical Officers	from	416	to	450
Accountant Officers	„	470	„	500
Chaplains and Naval Instructors ...	„	129	„	139

A grade of engineer officers of warrant rank has been established as an encouragement to engine-room artificers who have rendered meritorious service, and at the same time as a step which will contribute towards meeting the growing requirements of the Fleet.

The pay of chief boatmen of the coastguard will be assimilated to the pay of petty officers, 1st class, afloat, by giving them 2*s.* 5*d.* a day after four years' service in that capacity.

As proposed last year, the Black Prince has been commissioned as an additional training-ship for boys at Queenstown. This vessel has not yet started her training service, owing to delays in the execution of the necessary alteration at that port; but the service will shortly be commenced.

The entry of youths direct through the sea-going training-ship Northampton, which was commissioned in 1894, has been continued, and the numbers presenting themselves for enrolment have exceeded expectations. It was therefore decided to further develop this source of entry, and the Curaçoa was commissioned for this purpose in June, 1896. It is estimated that she will be capable of training about 250 youths in the course of the year. As these youths, who are entered at a somewhat more advanced age, have been reported on as quite satisfactory, and as the system accelerates the increase in the seamen class, it is now intended to employ a third vessel (Calliope), capable of producing about the same number as the Curaçoa. The output from these sources will add about 1,200 to the seamen class in the course of the financial year.

A new arrangement as regards the entry and training of Naval cadets has been instituted, and will come into force in the present year. It has been decided to gradually raise the age for entering Naval cadets by one year, and to shorten their course of instruction in the Britannia to about 16 months. The examination of candidates for the Britannia will be modified accordingly. In future cadets will be entered three times a year instead of twice, which will result in an increased number of entries every year. Under this system about 190 cadets will be passed through the Britannia yearly, instead of 125 as at present. It is anticipated that this will ultimately produce about 170 sub-lieutenants each year, instead of 116 as at present.

The Racer has been attached as tender to the Britannia, to replace the Wave, and during the summer months was continually occupied in cruising.

It is proposed to appoint a Committee on the general question of the education and training of junior executive officers afloat after they have left the Britannia.

The Royal Marines.

The Estimates provide for the addition of a further 1000 men to the corps. Of this 1000 men, 500 will be for the artillery and 500 for the infantry branch of the corps, including nine officers for each branch.

2776 recruits have been raised during the year. The majority of those entered were youths of from 18 to 20 years of age, of good average height and stature. The standard height was maintained at an average of 5 feet 6½ inches, with an average chest measurement of

34 inches. A certain proportion were growing lads under 18, with a physical equivalent, in most cases, to that represented by the higher age.

During the past year, also, satisfactory progress has been made with respect to the character of the recruiting rendezvous in the various towns. Changes have been made by which in most of the towns recruiting centres for the Navy and marines have gradually assumed a form of government bureau, usually a separate office with room or rooms in a business neighbourhood, where a respectable recruit can enter into his contract with the Crown without the former bad adjuncts.

Recruiting staff officers, who are officers on the retired list, are now stationed at nine of the most important cities and towns, and they are held responsible for the whole of the recruiting duties in the surrounding country.

It has been decided that the depôt at Walmer shall be under the command of a colonel commandant in lieu of a second commandant as at present.

Senior officers of Royal Marines while serving in flag-ships will be granted a flag allowance as allowed to the senior officers of other branches of the service. Subaltern officers of the Royal Marines will be paid an allowance to assist in defraying the expenses of messing while afloat.

Some advance has been made since last year in respect to the question of ranges for practice with the Lee-Metford rifle, in regard to which some difficulty has been experienced both by the Admiralty and War Office, in finding land of sufficient scope and extent to carry out the firing with the new arm with safety.

For the Chatham and Portsmouth divisions the adjacent ranges at Gravesend and Browndown are now fully available for the firing of the men at those places. The range for the R.M.A. at Eastney is partially so, and will, during the coming year, be made fully equal to the requirements of that division.

The firing of the recruits at Walmer, however, has still to be carried out at Gravesend, but steps are about to be taken to render the Walmer range adaptable, and it is expected to be available during the present year. The Plymouth division ranges are also not yet available, and the firing of the men has still to be carried out at Browndown.

The whole of the marines on shore and afloat are, with few exceptions, now armed with the new Magazine rifle.

The new barrack buildings at Walmer were occupied in September last, and the recruit depôt now affords accommodation for 1500 men.

ROYAL NAVAL RESERVE.

The total number of officers now on the active lists who have served for twelve months' training in the Navy, or are now serving under training, are:—

Lieutenants	114
Sub-lieutenants	65
Midshipmen	4
Total	183

Provision will be made in the coming Estimates to increase the executive officers' list by 100 over the numbers provided in last year's Estimates, making a total of 1400 officers, besides 300 engineer officers.

The reports received from the captains of ships, with whom the Reserve officers served during the recent manœuvres, reflect great credit upon the Reserve.

In order that engineer officers of the Royal Naval Reserve may acquire a knowledge of the working of engines and boilers used in H.M. ships, arrangements are being made to receive a limited number of these officers for a course of instruction at the home ports.

Opportunities will be given to them to study the construction and repair of machinery in the dockyards, and also the working of the engines and boilers of torpedo-boat destroyers and torpedo-boats, and of other classes of ships when undergoing their trials. The course of instruction will last about three months, and during this period officers will receive the same rate of pay as they would receive if called out for service in the Navy, together with lodging and provision allowances.

It has been decided to make very considerable changes in the conditions of service of seamen of the Royal Naval Reserve, with the view of improving their efficiency. The leading features will be as follows:—

Instead of the present first and second class, two new classes will be constituted—(1) qualified seamen, (2) seamen. First enrolments in, or promotion to, the classes under the old system will cease, but all men already in these classes will be entitled to remain in them as heretofore and retain the same emoluments.

All seamen who enter the Reserve in future will join the lower or "seamen class," except men who have been discharged from the Royal Navy after completing their first continuous service engagements.

Men enrolled in the "seamen class" will be entered under the same conditions as to age and service, and with the same rate of pay and allowances as the present second-class men. They will be called upon within their first term of enrolment to enter upon a period of six month's training in the Royal Navy, and failing to carry out this training will not be retained in the Reserve.

Upon the completion of six months' Naval training, men will be advanced to be "qualified seamen" under certain conditions as to character, health and capacity. The pay and allowances of men in this class during their active period of service in the Reserve will be the same as those of men of the present first class. Such men as complete a subsequent period of six months' satisfactory training in a man-of-war, or two periods of three months each, making twelve months in all while in the Reserve, will become entitled to receive a pension of £12 a year on reaching the age of sixty. Except in special circumstances men over thirty-five years of age will not be accepted for a second or third period of training.

Men who have served their 10 or 12 years continuous service engagements in the Royal Navy, and have been discharged with a good character, and rating not lower than that of A.B., will be entered as "qualified seamen," and will be able to earn a pension of £12 a year, payable on reaching the age of 60, by length of service in the Reserve without any further training in the Royal Navy.

In the event of men now in the first class volunteering for Naval training they will receive pay as on the existing scale, and will, in addition, be granted a Naval training gratuity of 10*s.* a month, which will be paid on the completion of their training.

Men now in the second class will be able to obtain promotion to the new "qualified seamen" class in the same manner and subject to the same conditions as men in the new "seamen" class. Those who have already served six months in the Navy and are otherwise qualified will be promoted to the "qualified seamen" class. Service in the second-class Reserve or in the "seamen" class will count as full time towards pension.

It is proposed to raise the number of men voted by 1,100, *i.e.*, 600 of the seamen class and 500 firemen, making a total of 22,000 seamen, 3,000 firemen, and 300 boys. When the new scheme is in full operation, men will be entered only in the ratings of the new class.

Provision has been made in the Estimates for embarking 1,200 men for 6 months' training in 1897–98, which would be equal to 600 men always afloat.

All drill ships and all but the smallest Royal Naval Reserve batteries now have modern B.-L. and Q.-F. guns for the instruction of the Royal Naval Reserve.

Good reports have been received in regard to the training of officers and men on board the modern cruisers at North Shields and Southampton, and it is proposed to extend the system. The replacement of the President by the second-class cruiser Apollo will be one of the first steps taken in the coming financial year.

The drill ships and batteries will be supplied during the year with the new Lee-Metford Rifle, and it will then be possible to instruct the Royal Naval Reserve in the use of this modern weapon.

590 men were embarked for service during the 1896 manœuvres in twenty-four different ships, and their conduct and ability as recorded on their certificates by the captains of the ships in which they served have been very satisfactory. Favourable reports also have been received from H.M. ships in regard to the conduct and ability of the men who have completed six or twelve months' training in the Navy.

An arrangement has been made by which men of the seamen pensioner Reserve holding higher gunnery and torpedo ratings will in future, once in every three years, carry out their annual fourteen days' drill at their nearest gunnery or torpedo school, instead of at the local batteries or drill ships.

Mobilisation.

The torpedo school proposed for Sheerness-Chatham last year has now been established.

The number of vessels and torpedo-boats taking part in the summer manœuvres of 1896 was 105, manned by 20,500 men, as compared with 75 vessels manned by 17,344 men in the 1895 manœuvres.

A number of the older ships on foreign stations have been relieved by larger modern vessels of greater speed and carrying more powerful armaments.

There are at present twenty-five torpedo-boat destroyers in commission. Of these, five have been sent out to the Mediterranean and

two to the China Station, where they are attached as tenders to various battleships and cruisers. Eighteen are distributed between the home ports for instructional purposes, the crews being frequently changed with the object of securing the training of as many men as possible in this special service.

In view of the increase of the squadron in Chinese waters, a Rear-Admiral has been sent out as second in command on that station.

In continuance of the policy of commissioning the new ships as soon as they are ready for service, the following further changes will be made in the course of the coming year:—Another first-class battleship (of the Majestic class) will be added to the Channel Squadron. Four battleships of the same class will replace in the Channel Squadron others of the Royal Sovereign class, which will be sent as reliefs to the Mediterranean. The battleships so relieved will take the place of older ships in the coastguard and Naval ports at home.

New Construction.

The programme of new construction undertaken during the financial year 1896-97 involved an expenditure considerably exceeding that incurred in any preceding financial year, and the numbers and types of new ships to be laid down were exceptional. The details of this programme appear in the statement of last year. In carrying out so large a programme difficulties necessarily had to be faced; but, on the whole, expectations have been realised in both the dockyard and the contract sections of the work.

The extended use of water-tube boilers in ships of large displacement and power involved unusual demands upon the tube manufacturers at a time when exceptionally large orders had been placed in their hands in connection with industries other than shipbuilding. This circumstance has caused delays in the construction of the boilers for certain ships. In all other respects rapid progress has been made in the advancement or completion of new vessels.

Shipbuilding in 1896–97.

Battleships.

At the commencement of the year the Renown and seven vessels of the Majestic class were in hand. Of these the Prince George and Victorious have been completed, the former being in commission with the Channel Squadron. The Renown is also ready for service if required. She has not yet been passed into the Fleet Reserve, as

new propeller blades are being fitted, a work which will be completed very shortly.

The Mars and Jupiter have been delivered by the contractors five months within their contract dates. The steam trials will be at once proceeded with, and the work remaining to be done, which chiefly affects the installation of the armament, will be rapidly completed, so that these vessels will be ready for service in the summer of this year.

The Cæsar, Illustrious, and Hannibal have been greatly advanced, and will be completed towards the autumn.

Five battleships of the Canopus class have been commenced in 1896–97; three of these are building in the dockyards and two by contract. All of them are in comparatively early stages of construction, but are being rapidly pushed forward.

The Ocean, one of this class, is in construction at Devonport, that yard having been equipped for building vessels of the largest class, a position which it formerly held, although for many years past such vessels have been built only at Portsmouth, Chatham, and Pembroke.

First-Class Cruisers.

The Powerful and Terrible were delivered by the contractors about six months within their contract dates. The steam trials extended over a considerable period. The ships have now been practically completed, and the Powerful will be commissioned at an early date. Though in many features these vessels go beyond precedent, the intentions of their design have been completely realised or exceeded in regard to draught, stability, and speed.

The four first-class cruisers of the Diadem class, laid down in 1895, have been satisfactorily advanced. Difficulties mentioned above, in regard to the delivery of boiler tubes, have interfered somewhat with the progress of the work up to date. These difficulties have now been surmounted. The three contract ships of the class, apart from unforeseen contingencies, will be completed considerably within the period of their contract. The Andromeda at Pembroke has also made good progress, but the date of her launching has been postponed in consequence of the retarded delivery of the boilers.

Four new vessels of the Diadem class have been begun during 1896–97, in accordance with the programme. The designs are in substantial agreement with those for the Diadem as regards structure, armament, and protection. Certain improvements have been made in the propelling apparatus and in details of construction, based upon more recent experience.

Second-Class Cruisers.

Nine vessels of the Talbot class were in construction at the commencement of the year. Of these, seven will be completed before the financial year closes, and two will be completed in April next. Two of the class are already in commission, and a third will soon be in service.

So far as experience has gone, the intentions of the design have been more than realised in this important class, the estimated speeds having been considerably exceeded and the conditions of draught and stability fully realised. On her first passage across the Atlantic the Talbot met with exceptionally heavy weather, and proved herself to be an excellent sea boat.

During 1896–97 three new vessels of this class have been ordered by contract, which, while resembling their predecessors in form, displacement, and coal endurance, have been given a more powerful armament, water-tube boilers and a higher speed, without any sacrifice of other qualities.

The four vessels of the Arrogant class building in the dockyards have been hindered by the delays in the delivery of their water-tube boilers, but it is anticipated that the leading vessel will be finished next summer, and that all the vessels will be ready for service during the coming financial year.

Third-Class Cruisers.

Eight vessels of the Pelorus class have been in hand during 1896–97. The Pelorus herself has been completed and tried. The intentions of the design have been realised or exceeded in regard to speed, draught, and stability.

Progress on the five contract built vessels of this class has been, as in other cases, considerably affected by difficulties in the delivery of boiler tubes. These have now been surmounted, the work is progressing rapidly, and during the next financial year all the vessels will be completed.

Torpedo-Boat Destroyers.

At the date of the last Statement 90 vessels of this class were built, building, or to be ordered in 1896–97. Forty-two of these were of the earlier type with contract speeds of 26 to 27 knots; forty-five have contract speeds of 30 knots, and three have contract speeds of 32 to 33 knots.

Six of the first group are not yet delivered, the contractors having experienced a difficulty in realising the contract speed. In all other respects they are practically complete.

Of the forty-five vessels in the second group, twenty-four have been launched, five have successfully undergone their speed trials, and four have been delivered. A considerable number of those which have been launched are far advanced, but have not yet completed their speed trials.

Progress on the 30-knot destroyers has not been so rapid as was originally anticipated by the firms carrying out their construction, all of whom had successfully fulfilled the conditions of their earlier contracts for destroyers. Experience has, in fact, proved that with each successive increase in speed, new and unforeseen difficulties have to be surmounted, but there is every reason for anticipating that success will be finally achieved in all the vessels. During the coming financial year all the vessels of this type should be delivered and tried.

The three vessels of still higher speed, above mentioned, are necessarily experimental in their character. Their construction has been undertaken by firms of large experience, and the guaranteed conditions will no doubt be fulfilled.

Shallow Draught Steamers.

During 1896–97 it was decided to undertake the construction of a flotilla of very light draught vessels suitable for river service, and built in such a manner as to be readily transported on board ship or on shore.

The vessels are of two types, differing only in size and speed. Six of the smaller type are in hand and two of the larger; and it is anticipated that they will all be completed by the early autumn of 1897.

NEW SHIPBUILDING PROGRAMME.

In the coming financial year it is proposed to commence—

Four battleships.
Three third-class cruisers.
Two sloops.
Four twin-screw gunboats.
Two torpedo-boat destroyers.

A new yacht for Her Majesty the Queen is to be laid down at Pembroke. The design is now in hand.

Of the foregoing vessels, three battleships, the three cruisers, and the two sloops will be built in the dockyards; the remaining battleship, the four gunboats and the two torpedo-boat destroyers will be built by contract. The propelling machinery and boilers for all the vessels, except for two third-class cruisers and one of the sloops, will be ordered from private firms.

The three battleships to be built in the dockyards will be laid down as soon as the slips now occupied by the Canopus, Goliath and Ocean, which will be launched towards the end of the year, shall become vacant.

Summary of New Construction.

From the preceding statements it will be seen that (including new orders) the following vessels will be under construction or completing during the course of 1897–98:—

Fourteen battleships.
Eight first-class cruisers.
Nine second-class cruisers.
Ten third-class cruisers.
Two sloops.
Four twin-screw gunboats.
Fifty-two torpedo-boat destroyers.
Eight light-draught steamers for special service.
One Royal Yacht.

Thus the total number of vessels of all classes under construction during the year will be 108. Their aggregate displacement tonnage will be about 380,000 tons, and the aggregate I.H.P. about 800,000 horse-power. It is anticipated that during the next financial year 66 of these vessels will be completed for service, including 50 torpedo-boat destroyers.

Reconstruction, Repairs, &c.

The following vessels among others have undergone large repairs and refits at the Home Yards during 1896–97:—

Edgar.	Magicienne.
Royal Arthur.	Beagle.
Aurora.	Egeria.
Leander.	Nymphe.
Amphion.	

Seven battleships and eight cruisers have been re-armed with quick-firing guns during the year.

The work in the royal dockyards continues to be carried on with zeal and energy. At the Naval yards abroad, and especially at Malta, the work has been very heavy, owing to the increase in numbers and size of the vessels in commission, and to the large number of ships re-commissioned abroad.

The details of the repairs and refits to be carried out in 1897–98 appear in the Appendix to the Estimates. One important item in

this section of the work will be the fitting of certain torpedo gunboats with new machinery and water-tube boilers.

Machinery and Boilers.

The following vessels have satisfactorily completed their contract steam trials during the present financial year:—

First-class battleships—

Renown.
Victorious.
Prince George.

First-class cruisers—

Powerful.
Terrible.

Further, seven second-class cruisers, one third-class cruiser, seven torpedo-boat destroyers of 27 knots speed, and five torpedo-boat destroyers of 30 knots.

The aggregate I.H.P. of the above-mentioned vessels is 220,000, of which about one-fourth is in destroyers.

The trials of the Mars and Jupiter, of the remaining two second-class cruisers, and of several destroyers, will probably be completed before the end of the current financial year.

In nearly all cases the steam trials of the larger ships have been quite successful. No trouble has been experienced with the water-tube boilers of any new ship, nor any serious difficulty with the machinery. Small adjustments and corrections have been found necessary in a few cases, but these were readily effected; and it is one of the chief purposes of these trials to ascertain and correct such minor defects.

The steam trials of the Powerful and Terrible were of exceptional interest, both on account of the magnitude of the power developed and of the application of water-tube boilers on so large a scale. The conditions of the contract in regard to the development of power were most satisfactorily fulfilled in both vessels.

In the case of the Terrible, some considerable delays, consequent on adjustments required in the engines, occurred during the preliminary trials. The final steam trials were remarkably satisfactory, as the following statement shows:—The trial preceding the high-speed trials was made on 6th January; the 30 hours' trial at 18,000 horsepower commenced on the following day and was completed on the evening of 8th January; and the eight hours' trial (at the maximum of 25,000 horse-power for four hours and at 22,000 horse-power for the following four hours) was successfully completed on 9th January.

2 D 2

The trial of the Pelorus with water-tube boilers, of the type hitherto chiefly used in destroyers, was also of great interest and was completely successful.

Experiments are also in progress in torpedo gunboats with boilers of the Niclausse, Babcock & Wilcox, and Mumford types, with a view to gaining further information.

Armour Plate Experiments and Manufacture.

During the year very extensive experiments have been made on armour plates supplied for the purpose of fulfilling conditions laid down by the Admiralty for governing future supplies. These conditions have embodied a higher standard than the corresponding conditions in former contracts. The results have shown that British manufacturers continue to hold the same good position in relation to their foreign competitors as they have held in the past.

The contracts for the armour of the vessels of the Canopus class have embodied this higher standard. They involve changes in the plant and processes of the makers, but there will be no difficulty in making these changes and proceeding with the manufacture, so as to keep pace with the progress of the ships.

During the present financial year the manufacturers have successfully met the large demands of the Admiralty, including much work of a specially difficult character.

Naval Ordnance.

The manufacture of 12-in. and other wire guns is proceeding satisfactorily. Improvements in design are being continuously effected.

The conversion of 6-in. and 4-in. B.-L. guns to quick-firers is proceeding rapidly.

The final trials of the 9·2-in. guns of the Powerful and Terrible have not yet taken place, but the guns have been mounted and worked.

Cordite has come into very general use for breech-loading wire guns and quick-firing guns as well as for small arms. Its employment will be still further extended as the present stocks of gunpowder are reduced.

Lee-Metford magazine rifles have been supplied to all ships and to the Royal Marines. Their supply will be extended to the Coastguard and the Royal Naval Reserve batteries during the year. Some delay has been caused by the difficulty of finding ranges suitable for the new arm.

The increase in Vote 9 of the Estimates for 1897–98 is principally

due to provision of ammunition for new ships; partly to the larger expenditure on practice ammunition for the increased number of men and ships; and partly to payments to the War Office for inspection, maintenance and care of Naval warlike stores.

Gun Mountings.

Continuous attention has been devoted to the improvement of the appliances for mounting and working all kinds of Naval guns.

The hydraulic mountings for the 12-in. barbette guns of the Majestic class have proved most successful. The preliminary trials of the mountings for the Cæsar and Illustrious have been satisfactory. Further improvements have been made in the designs of the mountings of the 12-in. guns in the battleships of the Canopus class.

The mountings of the 9·2-in. guns of the Powerful and Terrible are of a new type, capable of being worked either by manual power or by electricity. The trials so far made of the electrical appliances promise well for the further development of that system of working guns.

NEW WORKS.

New Works in the Estimates.

The principal new works for which provision is made in the Estimates of 1897–98, are:—

At Chatham, lengthening No. 5 Dock and providing a workshop for gun-mounting store.

At Sheerness, improvements to the water supply.

At Devonport, a new mould loft.

At Plymouth Victualling Yard, a new cooperage.

At Haulbowline, the establishment of a recreation ground for the training-ship.

At Malta, construction of wharf walls in deep water in French Creek and extensive dredging for the improvement of the harbour.

At Bermuda, extensive dredging for the improvement of the harbour.

Money is also provided for surveys for docks at Jamaica and Bermuda.

Works in Progress.

At Portsmouth, the new electric shop will be completed during the year. Work on the two new jetties is nearly finished, and the new boiler shop has been commenced.

At Devonport, the enlargement of No. 2 dock and the extension of No. 1 jetty with foundations for 100-ton sheers have been begun.

At Malta, the boiler shop is approaching completion. The new canteen is finished and has been opened for use.

Work is proceeding steadily in connection with the provision of an improved water supply for the Naval establishments at Jamaica and the Cape of Good Hope.

Progress under Naval Works Acts, 1895–96.

(*a.*)—*Inclosure and Defence of Harbours.*

Gibraltar.—On the "Admiralty Mole" Extension a length of 860 feet has been brought up to low-water level, and 116 feet more to 10 feet below low-water level. The rubble mound forming the base of the Detached Mole is in progress, and about 206,000 tons of stone have been deposited on the site. Two dredgers are at work deepening the harbour.

Portland.—The railways and incline from the quarry have been relaid, and the new shipping jetty is completed. The construction of the new breakwater between the Dolphins has been begun.

Dover.—The survey and plans have been completed and are now under consideration by an Inter-Departmental Committee, composed of representatives of the Admiralty, the War Office, and the Board of Trade.

(*b.*)—*Adapting Naval Ports to present needs of Fleet.*

Deepening harbours and approaches.

Chatham.—The work provided for under the loan has been completed.

Portsmouth.—The dredging of the bar is finished. The rest of the work is being proceeded with.

Devonport.—Good progress has been made.

Keyham Dockyard Extension.—The contractor is making satisfactory progress.

Portsmouth Docks.—The two new docks have been completed and are in use. The railways and approaches will be finished as soon as the ground has been sufficiently consolidated.

Gibraltar Dockyard Extension.—The site of the new dockyard is being embanked and reclaimed. The excavation of the New Mole Parade is practically finished.

The lengths of the docks as finally settled are :—

No. 1 (double) dock	850 feet.
No. 2 dock	550 feet.
No. 3 dock	450 feet.

Hong Kong Dockyard Extension.—Owing to the length of time occupied in communicating with such a distant station, and to the necessary negotiations with other departments, it has not been found possible to commence the work as yet, but it is hoped that plans will be shortly settled, and the work will then be put in hand without delay.

(*c.*) *Naval Barracks, &c.*

Chatham Naval Barracks.—The necessary land has been acquired. The reconstruction of the Brennan Torpedo Factory, which occupies part of the site, is proceeding, and the new buildings will be begun early in the summer.

Portsmouth Naval Barracks.—The War Office are arranging for the transfer of the Anglesea Barracks at an early date. Plans for the new Naval Barracks are under consideration.

Keyham Naval Barracks.—The plans have been approved and tenders will shortly be invited.

Chatham Naval Hospital.—Considerable difficulty was experienced in finding a suitable site for the hospital not too far removed from the Naval Establishments, but land has now been acquired, and plans for the hospital are being prepared.

Walmer Marine Depôt.—The new buildings have been completed and handed over for occupation.

Keyham Engineer Students College.—The new wing will be completed about April next.

Dartmouth College.—Much time was spent in an endeavour to arrange terms of purchase for the site selected by friendly negotiation with the representatives of the owners of the land, but unfortunately without success. Steps have now been taken to acquire the land under the provisions of the Naval Works Act of 1895.

Magazines.—The North Gorge Magazine at Gibraltar is nearly completed, and the new magazine at Corradino (Malta) is more than half finished.

Provision will be made in a Bill to be submitted to Parliament for the continuation of the unfinished works contained in the Schedule of the Naval Works Act, 1896, and for certain new works which Parliament will be asked to sanction. The Bill will also include provision for the completion of the improvements to the dockyards at Pembroke and Haulbowline, which are already in progress.

GEORGE J. GOSCHEN.

22*nd February*, 1897.

Abstract of Navy Estimates for 1897–98.

Votes.		Estimates, 1897–98. Gross Estimate.	Estimates, 1897–98. Appropriations in Aid.	Estimates, 1897–98. Net Estimate.	Estimates, 1896–97. Gross Estimate.	Estimates, 1896–97. Appropriations in Aid.	Estimates, 1896–97. Net Estimate.	Difference on Net Estimates. Increase.	Difference on Net Estimates. Decrease.	Votes.
	I.—NUMBERS.			Total Numbers.			Total Numbers.	Numbers.	Numbers.	
A.	Total Number of Officers, Seamen, Boys, Coast Guard, and Royal Marines	....	....	100,050	....	....	93,750	6,300	....	A.
	II.—EFFECTIVE SERVICES.	£	£	£	£	£	£	£	£	
1	Wages, &c., of Officers, Seamen and Boys, Coast Guard, and Royal Marines	4,808,585	112,585	4,696,000	4,536,100	116,300	4,419,800	276,200	....	1
2	Victualling and Clothing for the Navy	1,806,660	422,060	1,384,600	1,800,544	430,944	1,369,600	15,000	....	2
3	Medical Establishments and Services	185,776	24,376	161,400	180,382	24,182	156,200	5,200	....	3
4	Martial Law	10,675	75	10,600	10,630	30	10,600	....	....	4
5	Educational Services	114,915	29,315	85,600	111,578	30,278	81,300	4,300	....	5
6	Scientific Services	78,444	11,744	66,700	74,180	10,880	63,300	3,400	....	6
7	Royal Naval Reserves	250,007	107	249,900	229,911	111	229,800	20,100	....	7
8	Shipbuilding, Repairs, Maintenance, &c.:									8
	Section I.—Personnel	2,008,915	12,915	1,996,000	2,116,915	12,915	2,104,000	....	108,000	Sec. I.
	Section II.—Matériel	2,187,000	163,000	2,024,000	2,387,000	136,000	2,251,000	....	227,000	Sec. II.
	Section III.—Contract Work	5,248,100	38,100	5,210,000	5,423,480	37,480	5,386,000	....	176,000	Sec. III.
9	Naval Armaments	2,709,687	34,687	2,675,000	2,600,855	57,655	2,543,200	131,800	....	9
10	Works, Buildings, and Repairs at Home and Abroad	655,300	6,500	648,800	624,900	6,500	618,400	30,400	....	10
11	Miscellaneous Effective Services	205,077	9,677	195,400	198,746	9,546	189,200	6,200	....	11
12	Admiralty Office	251,300	7,700	243,600	245,560	8,760	236,800	6,800	....	12
	Total Effective Services . £	20,520,441	872,841	19,647,600	20,540,781	881,581	19,659,200	499,400	511,000	
	III.—NON-EFFECTIVE SERVICES.									
13	Half-Pay, Reserved, and Retired Pay	761,771	12,271	749,500	761,258	12,258	749,000	500	....	13
14	Naval and Marine Pensions, Gratuities, and Compassionate Allowances	1,075,176	21,976	1,053,200	1,052,090	21,990	1,030,100	23,100	....	14
15	Civil Pensions and Gratuities	327,785	385	327,400	324,889	489	324,400	3,000	....	15
	Total Non-Effective Services . £	2,164,732	34,632	2,130,100	2,138,237	34,737	2,103,500	26,600	....	
	IV.—EXTRA ESTIMATE FOR SERVICES IN CONNECTION WITH THE COLONIES.									
16	Additional Naval Force for Service in Australasian Waters—Annuity payable under	95,300	35,000	60,300	95,300	35,000	60,300	....	....	16
	GRAND TOTAL . £	22,780,473	942,473	21,838,000	22,774,318	951,318	21,823,000	526,000	511,000	

Net Increase £15,000

STATEMENT showing the Actual and Estimated EXPENDITURE for NAVAL SERVICES for the Three Years ending the 31st March 1898.

		£	s.	d.
1895–96	Estimated Expenditure	18,701,000	0	0
	Supplementary Estimate (3rd March 1896)	1,100,000	0	0
		19,801,000	0	0
	Net Expenditure, as per Final Account	19,637,238	2	4
	Net (Expenditure less than Estimate)	£163,761	17	8
1896–97	Estimated Expenditure (after deducting Appropriations in Aid)	£21,823,000	0	0
1897–98	Estimated Expenditure (after deducting Appropriations in Aid)	£21,838,000	0	0

STATEMENT of the Principal Points of DIFFERENCE between the ESTIMATES of 1896–97 and those for 1897–98.

INCREASES.		£
Wages, &c., of Officers, Seamen, and Marines		279,545
Victualling and Clothing		15,315
Medical Establishments and Services		4,595
Educational Services		3,750
Scientific Services		3,400
Royal Naval Reserves		20,100
Repairs, &c., of Ships and Machinery (Contract)		24,370
Inspection of Contract Work		5,000
Gun Mountings and Air-compressing Machinery (Contract)		64,508
Wages of Artificers employed in Naval Ordnance Establishments		11,947
Projectiles, Ammunition, Torpedoes, Guncotton, Small Arms, and Miscellaneous Stores, &c.		122,658
Expenses of Storekeeping, &c., in connection with Naval Warlike Stores at Army Depôts, hitherto included in Army Votes		15,500
Decrease in amount of Receipts arising from the Sale of Obsolete and Unserviceable Naval Armament Stores		16,318
Works, Buildings, and Repairs		30,400
Miscellaneous Effective Services (Piloting, Towing, &c.)		6,200
Non-Effective Services		26,600
Miscellaneous Items		11,495
DECREASES.	£	661,701
Wages, &c., of Men in Dockyards	111,703	
Naval Stores	219,000	
Increase in amount of Receipts arising from the Sale of Old Ships	12,000	
Machinery for Ships and Shore Establishments	241,103	
Hulls of Ships, &c. (Contract)	28,135	
Guns	34,760	
		646,701
Net Increase	£	15,000

STATEMENT showing the Total Estimated EXPENDITURE for the NAVAL SERVICE, including Amounts provided in the NAVY ESTIMATES, as well as in the CIVIL SERVICE and other ESTIMATES, for the following Services:—

——		1897–98.	1896–97.
NAVY ESTIMATES:		£	£
Estimated Expenditure (after deducting Appropriations in Aid)		21,838,000	21,823,000
CIVIL SERVICE ESTIMATES:			
Estimated Expenditure under—			
Class I. Vote 4.—Admiralty, Extension of Buildings (Net)		40,000	25,000
" I. " 9.—Public Buildings, Great Britain:	£		
Maintenance and Repairs, including New Works, Alterations, &c.	3,950		
Rents, Insurance, Tithes, &c.	8,750		
Fuel, Light, Water, &c.	3,800		
Furniture	2,200		
		18,700	13,500
Class I. Vote 10.—Surveys of the United Kingdom		150	100
" I. " 13.—Rates on Government Property		75,800	69,200
" I. " 14.—Public Buildings, Ireland:			
Coast Guard, viz.:	£		
Purchase of Sites	400		
New Works and Alterations, including Naval Reserve Stations	9,937		
Maintenance and Supplies	5,885		
Furniture, Fittings, &c.	5		
	£16,227		
Naval Reserve, viz.:			
Maintenance and Supplies	178		
		16,405	15,305
Class II. Vote 8.—Board of Trade:			
Staff and Incidental Expenses in connection with the Royal Naval Reserve Force		3,600	3,600
Class II. Vote 14.—Exchequer and Audit Department (Cost of Audit):	£		
Navy Cash Accounts	7,513		
Expense and Manufacturing Accounts	4,550		
Store Accounts	5,425		
		17,468	17,318
Class II. Vote 23.—Stationery and Printing		76,000	70,000
" III. " 1.—Law Charges, England (Net)		3,305	2,425
" III. " 8.—Prisons, England and the Colonies:			
Maintenance of Naval Prisoners		2,440	1,754
" III. " 14.—Prisons, Scotland		82	67
" III. " 21.—Prisons, Ireland		44	44
REVENUE DEPARTMENTS:			
Vote 1.—Customs.—Payment of Coast Guard District Ships, and Services connected with Seamen's Allotments		1,012	—
Vote 2.—Inland Revenue.—Analyses of Food, &c., and Services connected with Seamen's Allotments		410	—
Vote 3.—Post Office.—Postage of Official Correspondence (including Parcels)	£ 14,005		
Vote 5.—Post Office Telegraphs.—Official Telegrams and Expenses in connection with Telegraphs (Admiralty Wires, and Services of Clerks)	14,410		
		28,415	15,308
Total	£	22,121,831	22,056,621

Note.—In addition to the Services shown above, an annuity of £16,243 18*s.* is payable to the Commissioners of Woods, &c., from the Consolidated Fund, under the Public Offices Sites Act of 1882 (45 & 46 Vict. c. 32).

VOTE (A.)

NUMBERS

Of all Ranks for whom Provision is made in the Navy Estimates, 1897–98.

I.—Available for Sea Service . . . 91,513 } 100,050
II.—Other Services . . . . 8,537 }

One Hundred Thousand and Fifty.

I.—Available for Sea Service.

Under which Vote Provided.	Ranks, &c.	Numbers, all Ranks. 1897–98.		1896–97.		Average Numbers of all Ranks borne during the Year 1896.	Numbers of all Ranks borne on 1st January 1897.
	For Her Majesty's Fleet						
Vote 1	Flag Officers	15		14			
Vote 1	Commissioned Officers . .	3,214		3,132			
Vote 1	Subordinate Officers . . .	646		588			
Vote 1	Warrant Officers . . .	1,110		1,108			
Vote 1	Petty Officers and Seamen . .	62,087		56,420			
Vote 1	Boys.	3,400		4,495			
			70,472		65,757	62,292	64,359
	Coast Guard.						
Vote 1	Commissioned Officers . .	90		90			
Vote 1	Chief Officers of Stations . .	233		231			
Vote 1	Petty Officers and Seamen . .	3,877		3,879			
			4,200		4,200	4,103	4,108
	Royal Marines (for Service Afloat and on Shore).						
Vote 1	Commissioned Officers . .	406		390			
Vote 1	Warrant Officers . . .	29		28			
Vote 1	Staff Sergeants and Sergeants .	1,236		1,194			
Vote 1	Buglers and Musicians . .	574		568			
Vote 1	Rank and File	14,596		13,681			
			16,841		15,861	15,669	16,076
	Total numbers available for Sea Service . . .		91,513		85,818	82,064	84,543

Net Increase in Numbers . . . 5,695

II.—Other Services.

Under which Vote Provided.	Ranks, &c.	1897–98.		1896–97.		Average 1896.	1st January 1897.
Vote 1	Naval Cadets	265		280			
Vote 1	Engineer Students . . .	189		182			
Vote 1	Pensioners in Home Ships and in the Reserves	992		1,121			
Vote 1	Boys under Training . . .	6,000		5,300			
			7,446		6,883	7,047	6,730
Other Votes	Various Services . . .	..	1,091	..	1,049	1,049	1,049
	Total numbers for other Services		(a)8,537		(a)7,932	8,096	7,779

Net Increase in Numbers . . . 605

	1897–98		1896–97
(a) Including Officers and Seamen	2,373	—	2,488
" Boys	6,000	—	5,300
" Royal Marines	164	—	144
	8,537	—	7,932

VOTE 8.

SHIPBUILDING, REPAIRS, MAINTENANCE, &c.

I.—ESTIMATE of the SUM which will be required, in the YEAR ending 31st March, 1898, to defray the EXPENSES of SHIPBUILDING, REPAIRS, MAINTENANCE, &c., including the COST of ESTABLISHMENTS of DOCKYARDS and NAVAL YARDS at HOME and ABROAD.

DOCKYARD WORK.

SECTION I.—PERSONNEL.—One Million Nine Hundred and Ninety-six Thousand Pounds.

(£1,996,000.)

SECTION II.—MATÉRIEL.—Two Million and Twenty-four Thousand Pounds.

(£2,024,000.)

CONTRACT WORK.

SECTION III.—CONTRACT WORK.—Five Million Two Hundred and Ten Thousand Pounds.

(£5,210,000.)

II.—SUB-HEADS under which SECTION I., PERSONNEL, of this VOTE will be accounted for.

———	ESTIMATES.		Increase.	Decrease.
	1897–98.	1896–97.		
	£	£	£	£
DOCKYARD WORK.				
SECTION I.—PERSONNEL.				
Dockyards at Home.				
A.—Salaries and Allowances . . .	156,059*	157,115	..	1,056
B.—Wages, &c., of Men, and hire of Teams	1,566,732	1,680,343	..	113,611
C.—Wages, &c., of Police Force . .	39,603	37,853	1,750	..
D.—Contingencies	5,785	5,330	455	..
Naval Yards Abroad.				
E.—Salaries and Allowances . . .	56,091*	54,701	1,390	..
F.—Wages, &c., of Men, and hire of Teams	172,693	170,353	2,340	..
G.—Wages, &c., of Police Force . .	11,022	10,290	732	..
H.—Contingencies	930	930	..	..
£	2,008,915	2,116,915	6,667	114,667
Deduct,— I.—Appropriations in Aid	12,915	12,915	..	..
£	1,996,000	2,104,000	6,667	114,667
	Net Decrease	.	£108,000†	

* These amounts include the sums of £9,268 and £1,307 for pay of Inspectors of Shipwrights at Home and Abroad respectively, which is charged direct to the cost of shipbuilding.

† This Vote is increased by a transfer of £727 from Vote 1, £246 from Vote 2, and £950 from the Civil Service Estimates. The real decrease is, therefore, £109,923.

NOTE.—Provision has been made for New Construction in the above Vote to the extent of—

Section 1	£931,700
„ 2	843,170
„ 3	4,866,173
	£6,641,043

VOTE 8.—SHIPBUILDING, REPAIRS, MAINTENANCE, &c.—*continued.*

II.—SUB-HEADS under which SECTION II., MATÉRIEL, of this VOTE will be accounted for.

——	ESTIMATES.		Increase.	Decrease.
	1897–98.	1896–97.		
	£	£	£	£
DOCKYARD WORK—*continued.*				
SECTION II.—MATÉRIEL.				
Naval Stores.				
A.—Timber, Masts, Deals, &c.	105,000	130,000	..	25,000
B.—Metals and Metal Articles	1,000,000	1,149,000	..	149,000
C.—Coals for Yard purposes	54,000	53,000	1,000	..
D.—Hemp, Canvas, &c.	90,000	112,000	..	22,000
E.—Paint Materials, Oils, Pitch, Tar, Tallow, Boats, Furniture, and other Miscellaneous Articles	250,000	290,000	..	40,000
F.—Electrical, Torpedo, and other Apparatus	90,000	90,000	..	..
G.—Coals for Steam Vessels	525,000	500,000	25,000	..
H.—Freight	41,000	35,000	6,000	..
I.—Rents, Water, &c., Dockyards at Home, and Naval Yards Abroad	22,305	18,905	3,400	..
K.—Gas, &c., Dockyards at Home, and Naval Yards Abroad	9,695	9,095	600	..
£	2,187,000	2,387,000	36,000	236,000
Deduct,—				
L.—Appropriations in Aid	163,000	136,000	27,000	..
£	2,024,000	2,251,000	9,000	236,000
	Net Decrease		£227,000*	

* This Vote is decreased by a transfer of £150 to Vote 2. The real decrease is, therefore, £226,850.

VOTE 8.—SHIPBUILDING, REPAIRS, MAINTENANCE, &c.—*continued.*

II.—SUB-HEADS under which SECTION III., CONTRACT WORK, of this VOTE will be accounted for.

———	ESTIMATES.		Increase.	Decrease.
	1897–98.	1896–97.		
	£	£	£	£
SECTION III.—CONTRACT WORK.				
A.—Propelling Machinery for Her Majesty's Ships and Vessels . .	2,113,576	2,332,380	..	218,804
B.—Auxiliary Machinery for Her Majesty's Ships and Vessels . .	44,113	42,412	1,701	..
C.—Hulls of Ships, &c., Building by Contract	2,319,445	2,347,580	..	28,135
D.—Purchase of Ships, Vessels, &c. .	..	..	..	..
E.—Repairs and Alterations by Contract of Ships, &c., and their Machinery and Stores	101,600	77,230	24,370	..
F.—Inspection of Contract Work . .	50,000	45,000	5,000	..
G.—Gun Mountings and Air Compressing Machinery	535,766	471,258	64,508	..
H.—Machinery for Her Majesty's Shore Establishments at Home and Abroad	35,000	59,000	..	24,000
I.—Royal Reserve of Merchant Cruisers.	48,600	48,620	..	20
£	5,248,100	5,423,480	95,579	270,959
Deduct,—				
K.—Appropriations in Aid . . .	38,100	37,480	620	..
£	5,210,000	5,386,000	94,959	270,959
	Net Decrease . .		£176,000	

PROGRAMME of SHIPBUILDING, &c.

PROGRAMME of the ESTIMATED EXPENDITURE in CASH, and in VALUES OF STORES issued for SHIPBUILDING, RE-CONSTRUCTION, NET REPAIRS, MAINTENANCE, &c., in the Year 1897–98.

SUB-HEADS under which this ESTIMATED EXPENDITURE will be accounted for in the NAVY EXPENSE ACCOUNTS, under the provisions of Sec. 1 (2), ARMY AND NAVY AUDIT ACT, 1889.

	ESTIMATES, 1897–98. Direct Expenditure. Dockyard Work. Personnel, Sec. I.	Dockyard Work. Matériel, Sec. II.	Contract Work, Sec. III.	Total Direct Expenditure. (A)	1897–98. Establishment, &c., Charges, apportioned.	1897–98. Aggregate, 1897–98.	1896–97. Direct Expenditure. (B)	1896–97. Establishment, &c., Charges, apportioned.	1896–97. Aggregate, 1896–97.	Difference between Direct Expenditure, 1896–97 (B) and 1897–98 (A). Increase.	Difference between Direct Expenditure. Decrease.
	£	£	£	£	£	£	£	£	£	£	£
NEW CONSTRUCTION:											
A.—DOCKYARD-BUILT SHIPS—											
Hulls, &c. (c)	800,240	887,010	353,450	2,040,700	259,486	2,300,186	2,434,119	280,428	2,714,547	..	393,419
Machinery	41,800	26,600	577,594	645,994	22,729	668,723	559,358	17,543	576,901	86,636	..
	842,040	**913,610**	**931,044**	**2,686,694**	**282,215**	**2,968,909**	**2,993,477**	**297,971**	**3,291,448**	..	**306,783**
B.—CONTRACT-BUILT SHIPS—											
Hulls, &c. (c)	83,660	74,560	2,479,199	2,637,419	68,470	2,705,889	2,617,596	56,973	2,674,569	19,823	..
Machinery	..	..	1,395,671	1,395,671	23,121	1,418,792	1,705,518	24,932	1,730,450	..	309,847
	83,660	**74,560**	**3,874,870**	**4,033,090**	**91,591**	**4,124,681**	**4,323,114**	**81,905**	**4,405,019**	..	**290,024**
C.—SMALL VESSELS (d)	6,000	5,000	60,259	71,259	1,342	72,601	68,283	896	69,179	2,976	..
TOTAL NEW CONSTRUCTION	931,700	993,170	4,866,173	6,791,043	375,148	7,166,191	7,384,874	380,772	7,765,646	..	593,831 (Net.)
D.—RE-CONSTRUCTION, REPAIRS, ALTERATIONS, &c.	437,800	237,080	272,930	947,810	105,973	1,053,783	903,607	88,147	991,754	44,203	..
E.—SEA STORES, COALS, &c.	..	1,090,000	12,251	1,102,251	58,888	1,161,139	1,029,482	45,732	1,075,214	72,769	..
F.—ESTABLISHMENT, INCIDENTAL, AND MISCELLANEOUS CHARGES, UNAPPROPRIATED	..	..	..	..	1,048,751	1,048,751	..	1,039,305	1,039,305	..	..
TOTAL	1,369,500	2,320,250	5,151,354	8,841,104	**1,588,760**	**10,429,864**	**9,317,963**	**1,553,956**	**10,871,919**		

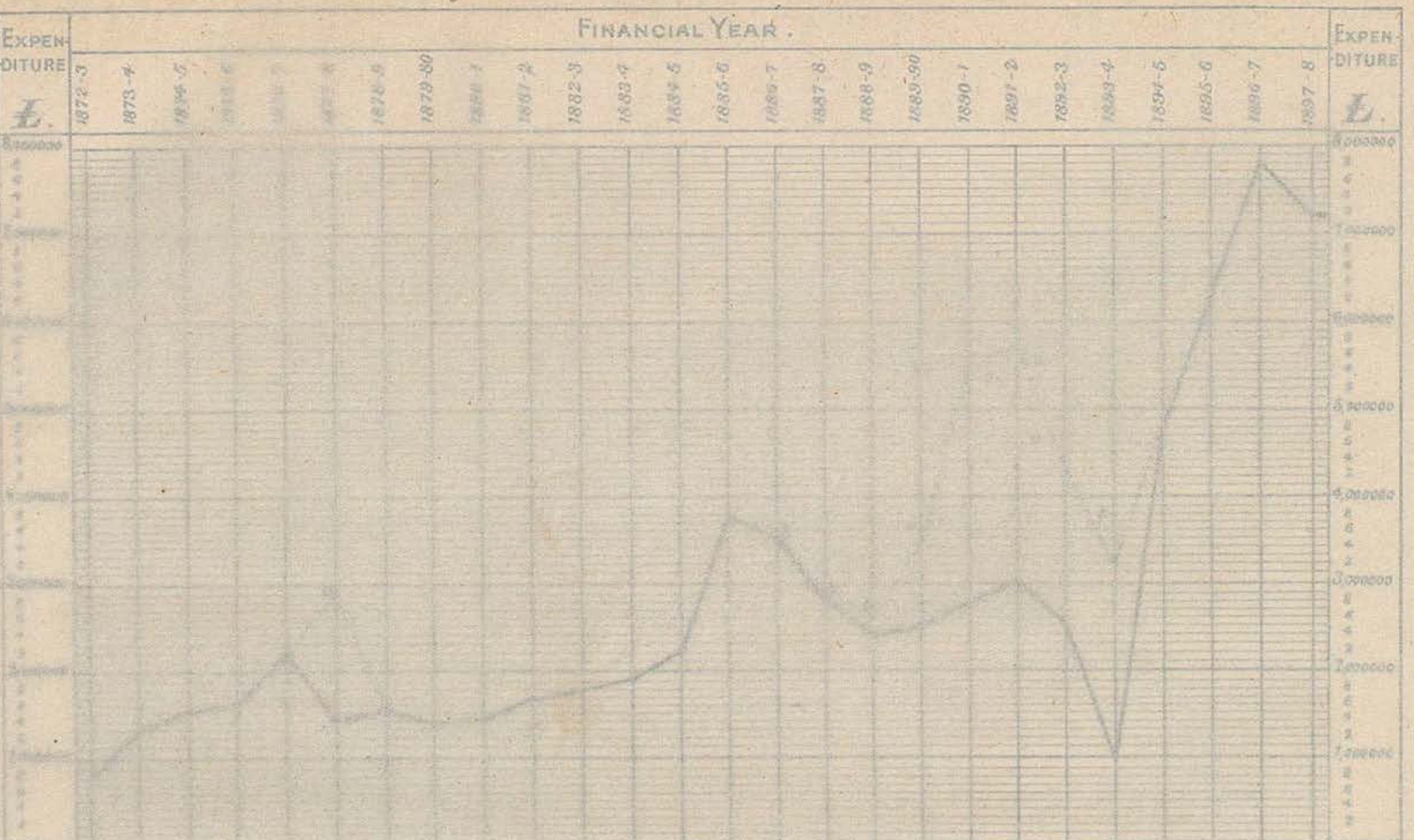
NET INCREASE ON DIRECT EXPENDITURE . . £476,859.

(c) Including Hydraulic and Transferable Gun Mountings, &c.
(d) Including Harbour Craft, and excluding Torpedo Boats, &c., the value of which is included under Sub-Heads A, B, and D.

RECAPITULATION OF ESTIMATED EXPENDITURE.

HEADS OF EXPENDITURE.	Estimated Expenditure.		Estimated Distribution of the Direct and Incidental Expenditure.							
			Naval Construction.					Establishment and Incidental Charges Unapportioned to Ships, &c.		
				Re-construction, Repairs, Alterations, and Refits.						
	Charged direct as Incurred.	Establishment and Incidental Charges Apportioned.	New Construction.	Ships Re-constructing.	Ships for Reliefs, or Re-commission.	Ships in Commission and Reserve.	Stores for Ships, Coals for Steaming, &c.	Fleet, Port, National, and Unappropriated Charges.	Unappropriated Charges (Haulbowline, Deptford, and Naval Yards Abroad).	Total Amount of Estimated Expenditure.
	(a.)	(b.)	(c.)	(d.)	(e.)	(f.)	(g.)	(h.)	(i.)	(k.)
SUB-HEADS OF EXPENDITURE.			A., B., and C.	D.			E.	F.		
	£	£	£	£	£	£	£	£	£	£
SECTION I.—DOCKYARD WORK. PERSONNEL	1,369,500	820,149	1,105,013	..	181,157	316,126	37,818	375,180	174,355	2,189,649
SECTION II.—DOCKYARD WORK. MATÉRIEL	2,320,250	600,348	1,114,387	..	92,941	186,584	1,111,070	237,942	209,784	2,920,598
SECTION III.—CONTRACT WORK	5,151,354	168,263	4,946,791	..	115,377	161,598	12,251	51,490	..	5,319,617
TOTAL ESTIMATED EXPENDITURE for 1897–98 £	8,841,104	1,588,760	7,166,191	..	389,475	664,308	1,161,139	664,612	384,139	10,429,864
TOTALS OF SUB-HEADS £	**10,429,864**		**7,166,191**	**1,053,783**			**1,161,139**	**1,048,751**		**10,429,864**

DIAGRAM SHEWING THE EXPENDITURE UPON THE CONSTRUCTION OF NEW SHIPS DURING THE 26 YEARS BETWEEN 1872-73 AND 1897-98.



Note — The distance of any point of the drawn line from the base represents on the scale of £s the ORDINARY expenditure of the year marked by the point. The distance of any point of the dotted line from the base represents on the scale of £s both the ORDINARY and the EXTRAORDINARY expenditure of the year marked by that point.

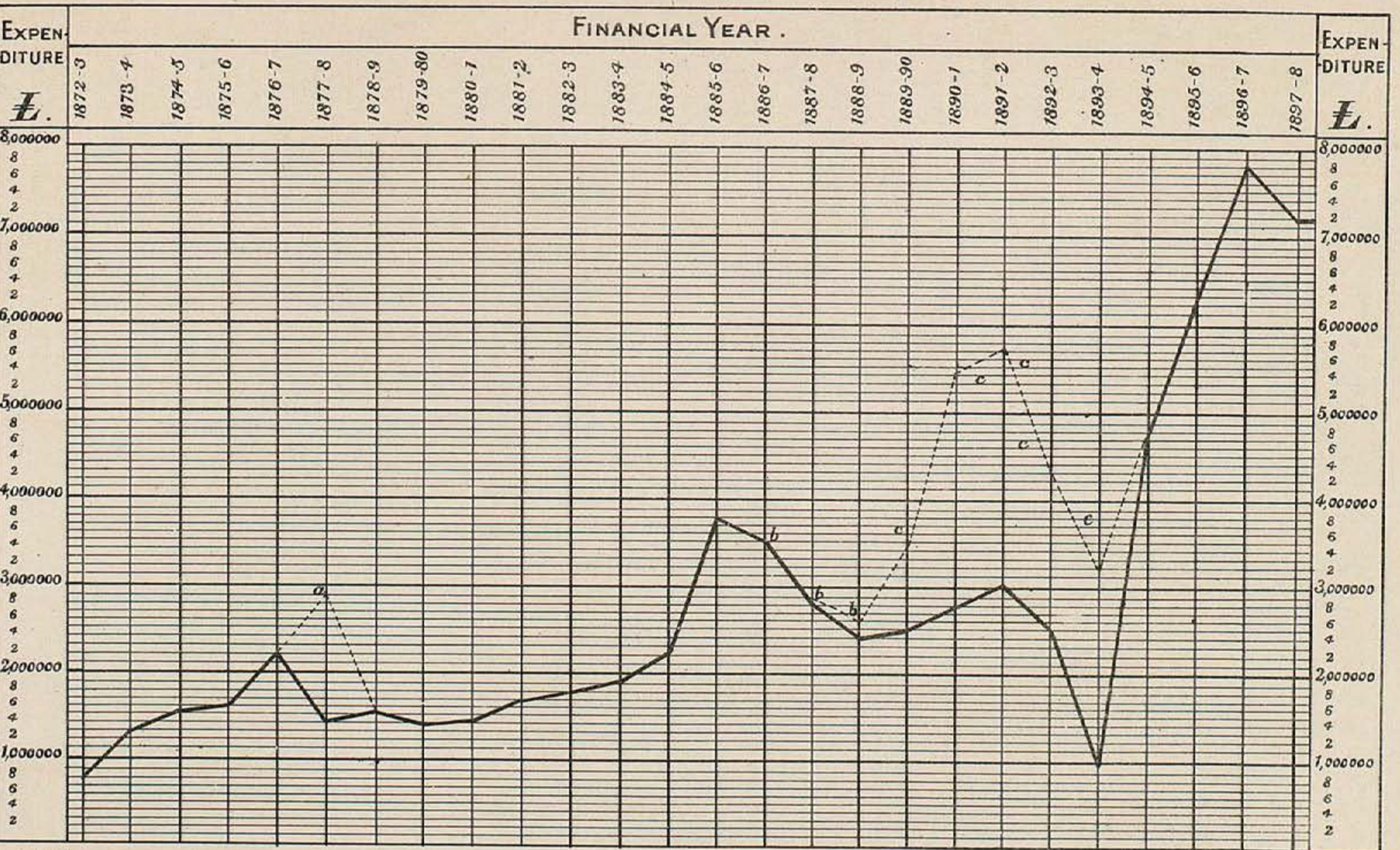
(a) Includes £1,033,900 Purchase of Ships under the Vote of Credit.
(b) Includes Expenditure under Lord Northbrook's Special Programme.
(c) Includes Estimated Expenditure under the Defence Acts of 1888 and 1889.

1896–97, 1897–98 } as given in the Navy Estimates for the respective years

RECAPITULATION OF ESTIMATED EXPENDITURE.

HEADS OF EXPENDITURE.	ESTIMATED EXPENDITURE.		ESTIMATED DISTRIBUTION OF THE DIRECT AND INCIDENTAL EXPENDITURE.							
			Naval Construction.					Establishment and Incidental Charges Unapportioned to Ships, &c.		
				Re-construction, Repairs, Alterations, and Refits.						
	Charged direct as Incurred.	Establishment and Incidental Charges Apportioned.	New Construction.	Ships Re-constructing.	Ships for Reliefs, or Re-commission.	Ships in Commission and Reserve.	Stores for Ships, Coals for Steaming, &c.	Fleet, Port, National, and Unappropriated Charges.	Unappropriated Charges (Haulbowline, Deptford, and Naval Yards Abroad).	Total Amount of Estimated Expenditure.
	(a.)	(b.)	(c.)	(d.)	(e.)	(f.)	(g.)	(h.)	(i.)	(k.)
SUB-HEADS OF EXPENDITURE.			A., B., and C.	D.			E.	F.		
	£	£	£	£	£	£	£	£	£	£
SECTION I.—DOCKYARD WORK, PERSONNEL	1,369,500	820,140	1,105,013	..	181,157	316,126	37,818	375,180	174,355	2,189,649
SECTION II.—DOCKYARD WORK, MATÉRIEL	2,320,250	600,348	1,114,387	..	92,941	186,584	1,111,070	237,942	209,784	2,920,598
SECTION III.—CONTRACT WORK	5,151,354	168,263	4,846,791	..	115,377	161,598	12,251	51,490	..	5,319,617
TOTAL ESTIMATED EXPENDITURE for 1897-98 £	8,841,104	1,588,760	7,166,191	..	389,475	664,308	1,161,139	664,612	384,139	10,429,864
TOTALS OF SUB-HEADS £	10,429,864		7,166,191	1,053,783			1,161,139	1,048,751		10,429,864

DIAGRAM SHEWING THE EXPENDITURE UPON THE CONSTRUCTION OF NEW SHIPS DURING THE 26 YEARS BETWEEN 1872-73 AND 1897-98.



Note — The distance at any point of the drawn line from the base represents on the scale £s, the ORDINARY expenditure of the year marked by the point. The distance at any point of the dotted line from the base represents on the scale of £s, both the ORDINARY and the EXTRAORDINARY expenditure of the year marked by that point.

(a) Includes £1,523,000. for purchas of Ships under the Vote of Credit.
(b) Includes Expenditure under Lord Northbrook's Special Programme.
(c) Includes Estimated Expenditure under the Defence Acts of 1888 and 1889.

1896–97. } as given in the Navy Estimates
1897–98. } for the respective years.

LIST of NEW SHIPS and VESSELS Estimated to be passed into the FLEET RESERVE during the Years 1897–98 and 1896–97.

1897–98.				1896–97.			
NAME OF SHIP.	Load Displacement in Tons.	Indicated Horse Power.	Number of Guns.	NAME OF SHIP.	Load Displacement in Tons.	Indicated Horse Power.	Number of Guns.
ARMOURED SHIPS:				**ARMOURED SHIPS:**			
Hannibal	14,900	10,000	16	Renown	12,350	10,000	14
Illustrious	14,900	10,000	16	Prince George	14,900	10,000	16
Cæsar	14,900	10,000	16	Victorious	14,900	10,000	16
Mars	14,900	10,000	16				
Jupiter	14,900	10,000	16				
PROTECTED SHIPS:				**PROTECTED SHIPS:**			
Terrible	14,200	25,000	14	Powerful	14,200	25,000	14
Arrogant	5,800	10,000	10	Eclipse	5,600	8,000	11
Furious	5,800	10,000	10	Minerva	5,600	8,000	11
Gladiator	5,800	10,000	10	Talbot	5,600	8,000	11
Dido	5,600	8,000	11	Juno	5,600	8,000	11
Isis	5,600	8,000	11	Doris	5,600	8,000	11
				Venus	5,600	8,000	11
				Diana	5,600	8,000	11
UNPROTECTED SHIPS:				**UNPROTECTED SHIPS:**			
Proserpine	2,135	5,000	8	Pelorus	2,135	5,000	8
Pactolus	2,135	5,000	8				
Perseus	2,135	5,000	8				
Pyramus	2,135	5,000	8				
Prometheus	2,135	5,000	8				
Pegasus	2,135	5,000	8				
Torpedo Boat Destroyers 50 No.	various.			Torpedo Boat Destroyers 10 No.	various.		

SUPPLEMENTARY ESTIMATE OF HER MAJESTY'S NAVY,

For the Year 1896–97.

AN ESTIMATE of the further Amount which will be required during the Year ending 31st March 1897, beyond the Sum already provided in the Grants for Navy Services for the Year (Parliamentary Paper No. 68, Session 1896), to meet the additional Expenditure arising on the undermentioned Votes.

Five Hundred and Seven Thousand Pounds.

(£507,000.)

Vote.	Description.			Amount.
8	Ship-building, Repairs, Maintenance, &c.:			
Sec. II.	Matériel:		£	£
	Sub-Head B.—Metals and Metal Articles		270,000	
	Original Estimate	1,149,000		
	Revised Estimate	1,419,000		
	Sub-Head G.—Coals for Steam Vessels		116,900	
		£		386,900
	Original Estimate	500,000		
	Revised Estimate	616,900		
9	Naval Armaments:			
	Sub-Head F.—Guns (Advancement of Work)		30,000	
		£		
	Original Estimate	801,900		
	Revised Estimate	831,900		
	Sub-Head G.—Projectiles and Ammunition (Advancement of Work)		55,000	
		£		
	Original Estimate	1,010,200		
	Revised Estimate	1,065,200		
	Sub-Head I.—Small Arms and Miscellaneous (Advancement of Work)		15,000	
		£	100,000	
	Original Estimate	323,400		
	Revised Estimate	338,400		
	Add,— Sub-Head M.—Appropriations in Aid— To make good the deficit in the amount of Receipts from Sale of obsolete and unserviceable Stores, &c.		20,000	
		£		120,000
	Original Estimate	57,655		
	Revised Estimate	37,655		
10	Works, Buildings and Repairs at Home and Abroad: Sub-Head B. (Part I).—New Works, &c., Dockyards at Home. (For work at Devonport on reconstruction of a Jetty, and Foundations for 100-ton Shears; Dredging, &c., in order to provide accommodation for large Battle-ships. Total estimated cost £20,000.)		—	100
		£		
	Original Estimate	185,395		
	Revised Estimate	185,495		
	Total . . £			507,000

French Navy Estimates for the Years 1897 and 1896.

Cap.	Heads of Expenditure.	Credits granted for the year 1897.	Credits granted for the year 1896.
		£	£
	PERSONNEL.		
1, 2, 3, 4	Admiralty Office	125,685	115,533
5, 6	Navy Pay	1,669,993	1,690,132
7	Marines.	513,698	519,539
8	Gendarmerie Maritime	30,586	31,196
9	Inspection of Administrative Services .	10,044	10,647
10	Construction Staff	69,480	72,448
11, 12, 13	Administrative Staff, Commissariat, etc. .	262,932	261,945
14	Medical and Religious Staff . . .	83,308	82,805
15	Fisheries and Navigation . . .	25,428	25,728
	LABOUR.		
	Wages—		
16	Shipbuilding; new construction; fitting for sea	477,114	487,504
17	Shipbuilding; repairs	271,935	257,217
18	Armaments; construction of new guns .	45,987	45,832
19	Armaments; repairs	58,074	57,878
20	Works	36,776	37,453
21	Victualling	20,358	20,294
22, 23, 24	Master-attendants' and Storekeepers' Departments	234,175	238,276
25	Miscellaneous	14,176	14,127
	MATÉRIEL.		
	Stores and Supplies—		
26	Admiralty	9,832	9,872
27	Shipbuilding in Dockyards . . .	1,467,089	1,333,360
28	Shipbuilding by contract . . .	960,000	1,214,276
	Ditto. Extraordinary credit .	——	76,500
29	Fitting for sea; maintenance; repairs .	353,197	496,594
	Carried forward . .	£6,739,867	£7,099,156

NOTE.—The above figures for 1896 are taken from the most recent Estimates, and differ in some cases from those given in last year's *Annual*.

Cap.	Heads of Expenditure.	Credits granted for the year 1897.	Credits granted for the year 1896.
		£	£
	Brought forward . .	6,739,867	7,099,156
	MATÉRIEL—*continued.*		
	Stores and Supplies—*continued.*		
30,31, 32, 33	Repairs, conversions, in dockyards and by contract	318,963	118,943
34	Armaments; new guns and conversions.	267,905	279,973
35, 36	Armaments; powder, ammunition and repairs	405,934	508,946
37	Torpedoes	95,128	75,725
38, 39	Works; new and large alterations. .	170,868	183,615
40	Ditto Supplementary for Defence of Military Ports	98,000	200,000
41	Works; repairs	55,080	55,080
42	Clothing	182,682	195,664
43	Colonial Medal	800	800
44	Victualling.	886,446	916,242
45	Barracks	25,882	26,082
46	Medical science, art and religion . .	64,897	68,598
47 to 51	Machinery	196,165	181,950
52	Fuel and Lighting	31,299	31,681
53	Office Furniture, etc.	39,834	41,892
	MISCELLANEOUS.		
54	Travelling expenses and freight . .	94,000	106,040
55	Allowance for lodging, etc. . . .	152,964	153,944
56	Charitable and subscriptions . . .	43,505	44,037
57	Fisheries and Commerce (materials for protection, etc.)	7,175	7,175
58	Pensions	424,256	376,451
59	Secret Service	800	4,000
60, 61	Miscellaneous	24,240	25,800
	Total . . .	£10,326,690	£10,701,795

NOTE.—The above figures for 1896 are taken from the most recent Estimates, and differ in some cases from those given in last year's *Annual.*

PROGRAMME OF NEW CONSTRUCTION, TO BE CONTINUED OR UNDERTAKEN IN 1897.—BUILDING IN DOCKYARDS.

Class.	Names of Ships.	Where Building.	Date of Commencement.	Probable Date of Completion.	Total Estimated Cost.	Expenditure proposed for 1897.
					£	£
Battleships	Charles Martel	Brest	April 1891	1897	1,028,611	62,792
	Carnot	Toulon	July 1891	1897	1,057,065	36,664
	Bouvet	Lorient	Jan. 1893	Commencement 1898	1,078,488	242,085
	Charlemagne	Brest	July 1894	1898	1,097,416	325,711
	Saint-Louis	Lorient	Mar. 1895	1899	1,078,280	248,129
	Gaulois	Brest	Jan. 1896	1899	1,098,476	263,585
	A 3	Brest	..	..	737,976	10,000
	Henry IV.	Cherbourg	Sept. 1896	1901	801,323	83,200
Armoured Cruisers, First-class	Bruix	Rochefort	Nov. 1891	1897	401,738	12,160
	Jeanne d'Arc	Toulon	April 1896	1899	882,951	281,954
	C 3	Toulon	..	..	962,951	33,400
	D 2	Lorient	..	..	426,992	46,000
Second-class Protected Cruisers	Pascal	Toulon	Dec. 1893	1897	311,187	36,000
	Bugeaud	Cherbourg	April 1892	1897	298,637	12,800
	Du Chayla	Cherbourg	Mar. 1894	1897	307,787	22,628
	Cassard	Cherbourg	Oct. 1894	1897	310,080	88,375
Third-class Protected Cruisers	Galilée	Rochefort	April 1894	1897	217,178	24,394
	Lavoisier	Rochefort	Jan. 1895	1897	207,337	70,437
	D'Estréas	Rochefort	..	1900	188,748	32,096
Torpedo Cruiser	Fleurus	Cherbourg	Mar. 1891	1897	111,749	465
Sloop	Kersaint	Rochefort	May 1895	1898	109,373	46,652
Torpedo-gunboats	Dunois	Cherbourg	Mar. 1896	1898	126,282	36,629
	La Hire	Cherbourg	Mar. 1896	1898	126,282	41,302
Aviso-Transport	Vaucluse	Rochefort	May 1886	1900	83,057	..
Submarine Boats	Morse	Cherbourg	..	..	31,452	10,030
	Gustave Zédé	Toulon	..	..	77,236	3,463
Torpedo-boats	2 torpedo-boats of 85 tons	Cherbourg	..	..	38,201	8,936
	2 ditto	Toulon	..	..	38,201	12,376
TOTAL BUILDING IN DOCKYARDS				£	13,235,054	2,092,263

PROGRAMME OF NEW CONSTRUCTION, TO BE CONTINUED OR UNDERTAKEN IN 1897.—BUILDING BY CONTRACT.

Class.	Names of Ships.	Contractors.	Date of Contract.	Date of Completion.	Total Estimated Cost.	Expenditure proposed for 1897.
					£	£
Battleships . .	Jauréguiberry .	Soc. de la Méditerranée . .	April 1891	1896	1,049,826	28,000
	Masséna . . .	Soc. de la Loire	May 1892	1897	1,091,751	188,610
Armoured Cruisers First-class	D'Entrecasteaux	Soc. de la Méditerranée . .	Nov. 1893	1897	660,826	84,026
	Pothuau . . .	Soc. de la Méditerranée . .	Jan. 1893	1896	447,111	65,191
	D 3	..	..	..	424,104	77,200
Fast Cruisers .	Guichen . . .	Soc. de la Loire	Oct. 1895	1898	620,441	589,014
	Châteaurenault .	Soc. de la Méditerranée . .	Oct. 1895	1898	611,088	584,886
Second-class Protected Cruisers	Descartes . .	Soc. de la Loire	Aug. 1892	1896	335,193	15,200
	Catinat . .	Soc. de la Méditerranée . .	Feb. 1894	1898	324,019	50,259
	Protet . . .	Soc. de la Gironde	Aug. 1895	1897	323,526	64,111
	D'Assas . . .	Soc. de la Loire	Nov. 1893	1897	293,862	44,948
Third-class Protected Cruiser.	K 2	..	..	..	187,452	49,030
Torpedo Depôtship	Foudre . . .	Soc. de la Gironde	June 1892	1896	417,843	25,567
Torpedo Cruisers	Durandal* . .	Normand . .	Aug. 1896	1898	67,440	23,250
Gunboats . .	Surprise . . .	Normand . .	March 1893	1895	51,721	4,000
	T 1	..	..	..	52,924	8,990
Torpedo Gunboats or Destroyers.	Hallebarde* . .	Normand . .	Aug. 1896	1898	67,440	30,000
	M 2	..	..	..	102,052	17,050
Sea-going Torpedo Boats . . .	Mangini . . .	Soc. de la Loire	Jan. 1895	1896	26,485	1,545
	Cyclone . . .	Normand . .	Aug. 1896	1898	37,380	12,985
			Carried forward		£7,192,484	1,963,862

* These are of same dimensions though differently classed.—ED.

PROGRAMME OF NEW CONSTRUCTION, TO BE CONTINUED OR UNDERTAKEN IN 1897.—BUILDING BY CONTRACT—*continued.*

Class.	Names of Ships.	Contractors.	Date of Contract.	Date of Completion.	Total Estimated Cost.	Expenditure proposed for 1897.
					£	£
			Brought	forward .	. 7,192,484	1,963,862
First-class Torpedo Boats .	No. 201 . . .	Normand . .	May 1895	1896	18,000	5,668
	No. 202 . . .	Normand . .	May 1895	1896	18,240	5,908
	No. 203 . . .	Normand . .	May 1895	1897	18,240	8,981
	No. 204 . . .	Normand . .	May 1895	1897	18,240	11,781
	No. 205 . . .	Normand . .	May 1895	1897	18,240	11,781
Torpedo Boats .	No. 206 . . .	Soc. de la Gironde	July 1896	1898	15,541	10,603
	No. 207 . . .	Soc. de la Gironde	July 1896	1898	15,541	10,603
	No. 208 . . .	Soc. de la Gironde	July 1896	1898	15,541	8,262
	No. 209 . . .	Soc. de la Gironde	July 1896	1898	15,541	8,262
	No. 210 . . .	Soc. de la Gironde	July 1896	1898	15,541	5,994
	No. 211 . . .	Soc. de la Gironde	July 1896	1898	15,541	2,933
Torpedo Boats .	85-ton Torpedo Boat . .	..	..	..	18,240	2,320
	85-ton Torpedo Boat . .	..	..	..	18,240	2,320
	TOTAL BUILDING BY CONTRACT				£7,413,170	2,059,278

German Navy Estimates, 1897–98.

Ordinary Permanent Estimates.

	Proposed for 1897–98.	Granted for 1896–97.
	£	£
Naval Cabinet and Chief Command Department	1,840	1,965
Imperial Naval Office	50,876	47,007
Observatories	14,056	14,087
Accounts	14,697	13,874
Martial Law	1,872	1,759
Divine Service and Schools	3,339	3,170
Military Personnel	668,430	631,746
Maintenance of the Fleet	654,767	606,265
Victualling	37,986	36,283
Clothing	12,768	13,049
Barrack Administration, Cashiers, and Accountants	67,330	64,808
Lodging Allowance	53,761	50,693
Medical	49,599	47,868
Travelling Expenses, Freight Charges, &c.	96,258	85,056
Training Establishments	10,426	10,660
Dockyard Expenses	880,275	825,954
Ordnance and Fortification	249,971	242,131
Accountant-General's Department	21,335	20,452
Pilotage and Surveying Services	23,564	22,624
Miscellaneous Expenses	33,114	29,664
Total . . . . £	2,946,264	2,769,115

SPECIAL ORDINARY ESTIMATES.

Shipbuilding Programme, 1897-1898.

For the Construction of—	£
Battleship 1st class Kaiser Friedrich III., 4th instalment . .	231,000
Armoured Cruiser Ersatz Leipzig, 3rd instalment . . .	200,000
Cruiser 2nd class K, 3rd and final instalment	200,000
" " L, " "	200,000
" " Ersatz Freya, 3rd and final instalment . .	200,000
Renewal of engines and boilers, 2 ships of Sachsen class, final instalment	100,000
Battleship 1st class Ersatz Friedrich der Grosser, 2nd instalment.	200,000
Cruiser 2nd class M, 2nd instalment	200,000
" " " N, "	200,000
" 4th " G, "	55,000
One Torpedo Division boat, 2nd and final instalment . . .	14,550
Repair of Torpedo-boats, " " . . .	69,200
Renewal of engines and boilers of ships, 3 and 4, Sachsen class, 2nd instalment	100,000
Battleships 1st class, Ersatz Konig Wilhelm, 1st instalment .	50,000
2nd class Cruiser O, 1st instalment	50,000†
" P, "	50,000†
Sloop Ersatz Falke, 1st instalment	25,000†
Gunboat Ersatz Hyane, 1st instalment	25,000
" Ersatz Iltis	50,000
One Torpedo Division boat	43,650†
Torpedo-boats, 1st instalment	90,000†
Total	£2,353,400

SUMMARY.

——	Proposed for 1897-98.	Granted for 1896-97.
	£	£
Ordinary Permanent Estimates	2,946,264	2,769,115
Shipbuilding	2,353,400	961,650
Armaments and Torpedo equipments . . .	679,900	359,250
Other Items	293,980	116,255*
Extraordinary Expenditure	194,434	106,725*
Total . . . . £	6,467,978	4,312,995

* These figures are taken from the most recent Estimates, and differ from those given in last year's *Annual*.

† The Budget Committee refused, on March 13, the credits for the construction of these ships, as well as the instalments for certain of the ships already building.—ED.

Italian Navy Estimates, 1897-98.

FINANCIAL YEAR, 1ST JULY, 1897, TO 30TH JUNE, 1898.

ORDINARY EXPENDITURE—GENERAL EXPENSES.

——	1897-8.	1896-7.
	£	£
Admiralty	42,700	41,040
Expenditure on various services connected with the Mercantile Marine	217,235	61,017
Total . . £	259,935	102,057

EXPENDITURE FOR NAVAL SERVICES.

	1897-8.	1896-7.
Ships fitting out	221,600	201,600
General Staff of the Navy	133,160	133,160*
Corps of Constructors	47,680	46,440*
Commissariat Service	36,080	36,192*
Medical Service	26,741	26,443*
Wages—Men	492,000	474,000
Gratuities	27,592	27,592*
Assistants to Constructors and others	52,712	48,577
Accountants	46,240	46,277
Police	10,760	10,760
Telegraph Service	5,920	5,920
Telegraph Materials	7,400	7,400
Provisions	280,000	273,000
Lighting	7,841	7,841
Hospital Services	19,191	17,820
Honorary Distinctions	560	560
Fuel	205,840	189,840
Salaries and Wages	5,904	5,904
Training Establishments	14,480	14,552
Naval Academy	4,320	4,640
Scientific Services—*Personnel*	1,384	1,384
" " *Matériel*	11,260	11,200
Law Charges	1,280	1,200
Transport	24,000	23,000
Materials for repair of Ships	294,400	270,400
Labour for same	229,104	217,104
Carried forward . . £	2,207,449	2,102,806

* These figures are the revised estimates, and differ from those given in last year's *Annual*.

——	1897-8.	1896-7.
	£	£
Brought forward	2,207,449	2,102,806
Guns, Torpedoes and Small Arms	356,000	356,000
Labour for construction and repairs of Armaments . .	85,461	74,461
Works Department—Repairs	78,000	72,000
Construction and Completion of the following Vessels, viz.:		
Battleships: Ammiraglio di Saint Bon, at Venice; Emanuele Filiberto, at Castellamare . . .		
5th Class Cruiser: Puglia at Taranto		
6th Class Cruisers: Agordat and Coatit, at Castellamare		
Armoured Cruisers: Carlo Alberto, at Spezia; Vettor Pisani, at Naples; Giuseppe Garibaldi, by Messrs. Ansaldo; Varese, by Messrs. Orlando; and another vessel	760,000	880,000
Torpedo-boat Destroyers		
Sea-going Torpedo Boats		
Small Craft		
Expenses of African Campaign	—	80,000
Total . . . £	3,486,910	3,565,267

EXTRAORDINARY EXPENDITURE.

	£	£
Half Pay.	1,000	1,040
Mercantile Marine—Construction at Naples . . .	2,000	2,000
Shipbuilding	20,000	20,000
Coast Defence	4,000	4,000
Fortifications, Maddalena	—	8,000
Torpedoes	24,000	20,000
Total. . . £	50,000	54,000

SUMMARY.

	£	£
Admiralty and Mercantile Marine	259,935	102,057
Naval Services	3,486,910	3,565,267
Extraordinary Expenditure	50,000	54,000
Grand Totals . . . . £	3,796,845	3,721,324

Russian Navy Estimates, 1897.

* Converted at £1 = 9·6 Roubles (*i.e.*, 1 Rouble = 25*d.*).

——	1897.	1896.
	£	£
Central Administration	190,249	188,936
Gratuities, Pensions, Education of Children	48,074	45,991
Naval Schools	73,184	67,324
Medical	92,073	90,600
Navy Pay	432,803	376,569
Provisions	91,839	87,048
Clothing	184,985	137,469
Maintenance of Fleet	1,235,811	949,021
Hydrographic Office	77,530	65,025
Guns, Torpedoes	844,938	677,058
Construction	1,574,595	1,906,300
Workshops and Offices	391,499	352,274
Hire, Maintenance, Construction, and Repair of Buildings	459,598	445,876
Religion	62,500	65,417
Exchange on Sveaborg expenditure	6,391	8,643
Fittings of Port Alexander III. and Construction of Dock at Vladivostock	333,333	312,500
Conversion of Guns	—	75,937
Expenditure on account of Estimates for 1898	19,061	18,144
Sundries	121,346	167,993
Total . . . £	6,239,809	6,038,125

* In last year's, and preceding *Annuals*, the Rouble was converted at £1 = 9 Roubles.

United States Navy Estimates, 1897 and 1898.

Calculated at £1 = $5.*

Detailed objects of Expenditure and Appropriations.	Estimates, 1897.	Appropriations, 1897 (current Year).	Estimates, 1898.
General Establishment—	£	£	£
Pay of the Navy	1,570,175	1,620,174	1,647,077
Pay, miscellaneous	52,000	52,000	60,000
Contingent Navy	1,400	1,400	1,400
Bureau of Yards and Docks—			
Ordinary Expenses	165,276	148,297	172,480
Public Works	259,038	154,616	274,733
Bureau of Navigation—			
Ordinary Expenses	57,950	28,960	31,890
Naval Academy	46,206	54,960	40,040
Bureau of Equipment	268,754	268,754	297,128
Bureau of Ordnance	353,438	299,865	288,765
Bureau of Construction	408,095	399,096	366,494
Bureau of Steam Engineering	241,880	226,880	234,421
Bureau of Supplies and Accounts	289,506	304,506	305,086
Bureau of Medicine and Surgery	27,440	27,440	27,440
Marine Corps—			
Pay Department	138,094	152,859	152,606
Quartermaster's Department	53,444	66,324	66,870
Naval Observatory	2,860	2,860	1,000
Total running Expenses	3,934,556	3,806,721	3,967,430
Increase, Navy—			
Bureau of Equipment	59,500	47,400	46,526
Bureau of Ordnance	791,040	884,291	1,544,159
Construction and Machinery	1,079,137	1,374,120	1,285,072
Total increase, Navy	1,927,677	2,305,811	2,875,757
Grand Total	£5,862,233	£6,112,532	£6,843,187

* This rate of exchange has always been adopted in the *Naval Annual*, but is not exactly accurate. At present rate of exchange, viz., £1 = 4·86⅝ dollars, the Appropriations for 1897 would amount to £6,279,672, and the Estimates for 1898 to £7,030,305.—Ed.

THE MERCHANT NAVAL AND THE NAVY RESERVE.

To the Editor of the TIMES.

SIR,—Residence in Melbourne, one of the few busy ports in which large fleets of sailing ships may still be seen, affords exceptional opportunities of judging of the quality of the British seaman of the modern time. I ask leave to give in your columns impressions formed from close personal observation and consultation with experienced ship-masters.

Throughout the recent discussions on the manning of our Merchant Navy no doubts have been expressed as to the officers. The confidence of the Admiralty has been conspicuously shown on a late occasion, when commissions were given to a hundred lieutenants selected from the Mercantile Marine.

It cannot be claimed that the same uniform excellence is found before the mast. British seamen of the finest type may still be seen with more education and as good seamanship as those who have gone before. Their numbers, however, are growing less, while the foreign element is increasing.

The causes for the reduction of numbers are not far to seek :—

1. Sailing tonnage is being more and more displaced by steam. The advantage in certain trades is open to question. The power supplied by the wind is cheap, and in the average of long voyages it is less uncertain than might be supposed. Its use should not be discarded for the transport of bulky commodities for which early delivery is not of urgent importance. Steamers may show good profits on their early voyages, but they depreciate rapidly. These considerations should prevent the entire disappearance of sailing ships. Such, however, is the tendency of the hour, and we are gradually losing the best school for the training of young seamen.

2. The seaman has not fully shared in the social and material progress of those who follow easier callings. For the hardships and privations which are his inevitable lot he has received no compensation in wages, his earnings being below those obtainable in any description of skilled labour on shore. The latest returns issued by the Board of Trade give the monthly pay of seamen in the Australian voyage at 55*s*. (fifty-five shillings), and there is no prospect of higher remuneration. Excessive competition has brought down freights to the wholly inadequate rate of from 20*s*. to 30*s*. a ton from Melbourne to London.

Shipowners are driven, by the cutting of rates, to the strictest economy under every head of charges except that for insurance. Crews have been reduced and wages are low. The improvidence of many seamen makes it impossible for them to combine with more thrifty men to secure an advance on a favourable opportunity. Spendthrifts are compelled to go to sea as soon as their credit is exhausted.

A general review of all the circumstances points clearly to the conclusion, that it is only by direct aid from the State that our Mercantile Marine can be preserved as a nursery for blue-water seamen. An ample supply of men from the fisheries may be obtained without assistance from the Government. But a certain proportion of men of a wider experience should be found in the Reserve of the Navy.

We have an admirable example of a well-organised Reserve in the French Inscription Maritime. Established under Colbert, it has been sedulously perfected by successive Administrations, and the results well merit attention. With a Merchant Navy of under 900,000 tons, as contrasted with the 10,500,000 tons of the British Empire, the French have no less than 135,000 men on the rolls. Omitting all non-effectives, a solid contingent of 40,000 men could certainly be furnished to the Fleet in time of war. Of the French Reserve 71,000 men are drawn from the coast fisheries, 10,000 from the deep-sea fisheries, 18,000 from the coasting trade, 21,000 from foreign-going ships. The remainder are serving in pilot boats and yachts. By skilful organisation the French have at their disposal more men than they could employ afloat, while our ability to man our ships is being called in question. We may accept the assurance that the resources for manning are adequate. But the further expansion of the Fleet will call for increased numbers of seamen, and considerations of economy must impose some limit on the permanent force.

All compulsory service creates burdens which are not shown in Navy and Army Estimates; but when every allowance has been made the direct cost of the French Inscription Maritime is relatively small. The exclusion of foreigners from vessels under the French flag puts no charge on estimates, while giving to the native seamen a valuable monopoly. In addition to this, and other privileges, the fisheries and Mercantile Marine of France are supported by bounties on a liberal scale. The seaman who has served 300 months afloat receives a pension in old age.

In a work on British seamen published many years ago, at the close of the inquiry of the Unseaworthy Ships Commission, I urged that the training of seamen should be encouraged by a bonus to

shipowners as well as by retainers to apprentices and seamen. I venture to renew the suggestion, believing it to be the only means of making our Merchant Navy as capable as that of France of rearing seamen for the Fleet.

Terms and conditions should be so laid down by the Admiralty as to secure satisfactory results. Only sailing ships should be subsidised. They should be of a suitable type and employed in voyages of circumnavigation. The numbers of their crews and their qualifications should be defined. All seamen and apprentices of the Reserve should be bound to serve when called upon. They should appear at stated intervals for inspection.

The Naval Reserve should be more thoroughly trained than at present. Every man in the French Reserves serves for forty months in the Navy. Our Reservists should do two years' service, possibly in ships specially commissioned.

It is necessary to conclude. I have endeavoured to show the necessity for a Reserve behind our permanent force. If this view finds acceptance, details may with confidence be left to Mr. Goschen and his Naval advisers.

I have the honour to be, Sir, your obedient servant,

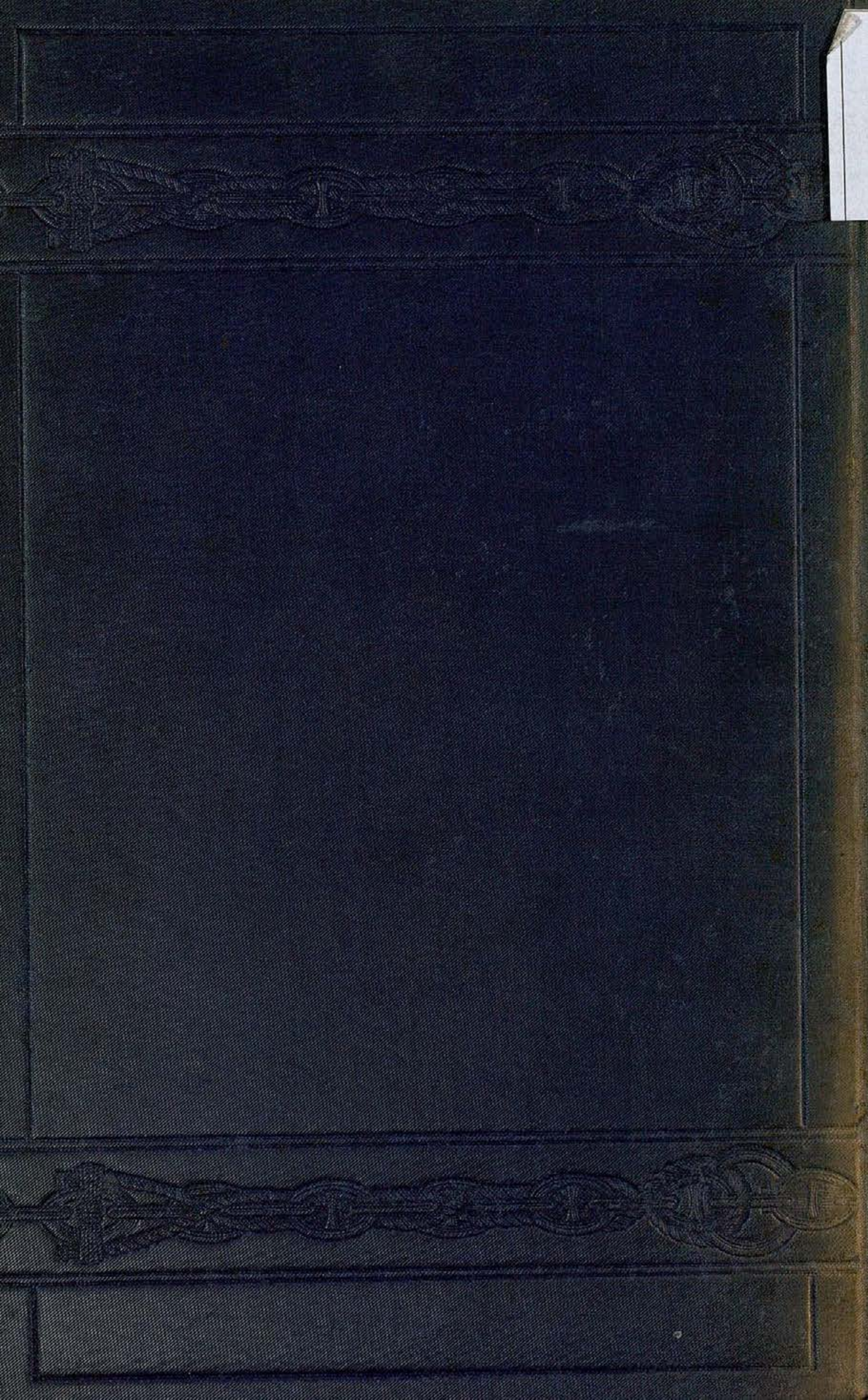
BRASSEY.

Sunbeam, R.Y.S. Off coast of New Zealand.

22*nd* January.

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